CURRICULUM - 2023

C -23

DIPLOMA IN ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

STATE BOARD OF TECHNICAL EDUCATION & TRAINING

ANDHRA PRADESH

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
CURRICULUM- 2023 (C-23)

INDEX

PREAMBLE

Technical Education is a key driver of economic development and plays a crucial role in providing individuals with the skills and knowledge necessary to thrive in the workplace. As technological advancements continue to reshape industries and create new opportunities, it is critical that technical education curricula remain relevant and up-to-date.

The curriculum has been designed with this in mind, with a focus on practical skills, critical thinking, and problem-solving. We believe that these skills are essential for success in both academic and professional spheres. The revamping of the technical education curriculum is made with collaborative effort from educators, industry experts, policymakers, and students.

At the heart of the curriculum, is the belief that the technical education should be **student-centered**, empowering learners to take ownership of their learning and pursue their passions. We aim to create a learning environment that is safe, supportive, and nurturing, where every student has the opportunity to reach their fullest potential. We acknowledge that learning is a lifelong journey, and our curriculum is designed to provide a solid foundation for continued growth and development. We hope that our students will not only leave with a diploma but with employability and passion for learning.

The State Board of Technical Education and Training, (SBTET) AP, has been offering Diploma programmes to meet the above said aspirations of the stake holders: industries, students, academia, parents and the society at large. **The Curriculum should be flexible, adaptable, and responsive to the changing needs of the industry and society.** As such, it has been the practice of SBTET, A.P., to keep the curriculum abreast with the advances in technology through systematic and scientific analysis of current curriculum and bring out an updated revised version at regular intervals.

The design of Curriculum C-23 was started in the month of January - 2023. Feedback was collected from all stake holders: Students, Lecturers, Senior Lecturers, Head of Sections and Principals for all programmes for this purpose. Accordingly, a workshop was convened on 15th February 2023 by Smt. C. Naga Rani, I.A.S, Director of Technical Education & Chairperson, SBTET, AP to discuss on revamping of C-20 curriculum to meet the needs of industries and for improvement of placements.

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

Smt. C Naga Rani, I.A.S., Commissioner of Technical Education while addressing in the workshop, emphasized the necessity of industrial training and on-hand experience, that the students need to undergo to support the industries and the Gaps in the Curriculum need to be fixed to make the students passionate to work in the industry in order to support economy of the country.

The committees of each branch consisting of experts from Industries, Higher Level Institutions and Faculty of Polytechnics are informed to study the possibility of incorporating the following aspects while preparation of the curriculum so as to improve employability.

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

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

The design of new Curricula C-23 for different diploma programmes has thus been finalised with the active participation of the members of the faculty teaching in the Polytechnics of Andhra Pradesh, and duly reviewed by Expert Committee constituted of academicians and representatives from industries. Thus, the primary objective of the curriculum change is to produce employable diploma holders in the country by correlating the growing needs of the industries with relevant academic input.

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

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

2. HIGHLIGHTS OF CURRICULUM C-23

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

1) The Weightage of theory & Practical in 50:50.
2) A new subject Big Data & Cloud Computing incorporated to meet the requirements of Industry.
3) A new lab Computer Networking & Cyber Security lab incorporated.
4) A new lab android programming lab in introduced.
5) Industrial Training (CISCO) is replaced with training in Industry or two online certificate courses.
6) A new concept "AGILE model" incorporated in software engineering.
7) Block Chain Technology & Digital Data Concepts are incorporated.

3. ACKNOWLEDGEMENTS

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

We are grateful to Sri. S. Suresh Kumar, I.A.S, Principal Secretary, Skills Development & Training for his valuable suggestions to bring the revamped curriculum C-23 in to a final form to meet latest Industry 4.0 concepts.

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

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

We also extend our sincere thanks to Sri. V. Padma Rao, Joint Director of Technical Education, Sri K.V. Ramana Babu, Secretary, SBTE&T, Andhra Pradesh, Sri K. Vijaya Bhaskar, Deputy Director (Academic) , Andhra Pradesh, officials of Directorate of Technical

Education and the State Board of Technical Education, Andhra Pradesh and all teaching fraternity from the Polytechnics who are directly or indirectly involved in preparation of the curricula.

4. RULES AND REGULATIONS OF C-23 CURRICULUM

4.1 Duration and pattern of the courses

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

4.2 Procedure for Admission into the Diploma Courses:

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

a) Candidates who wish to seek admission in any of the Diploma courses will have to appear for the Common Entrance Test for admissions into Polytechnics (POLYCET) conducted by the State Board of Technical Education and Training, Andhra Pradesh, Vijayawada. Only the candidates satisfying the following requirements will be eligible to appear for the Common Entrance Test for admissions into Polytechnics (POLYCET).
    a. The candidates seeking admission should have appeared for S.S.C examination, conducted by the Board of Secondary Education, Andhra Pradesh or equivalent examination thereto, at the time of applying for the Common Entrance Test for admissions into Polytechnics (POLYCET). In case of candidates whose results of their Qualifying Examinations is pending, their selection shall be subject to production of proof of their passing the qualifying examination in one attempt or compartmentally at the time of admission.
    b. Admissions are made based on the merit obtained in the Common Entrance Test (POLYCET) and the reservation rules stipulated by the Government of Andhra Pradesh from time to time.
    c. For admission into the following Diploma Courses for which entry qualification is 10+2, candidates need not appear for POLYCET. A separate notification will be issued for admission into these courses.
        i). D.HMCT ii).D. Pharmacy

4.3 Medium of Instruction

The medium of instruction and examination shall be English.

4.4 Permanent Identification Number (PIN)

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

4.5 Number of Working Days Per Semester / Year:

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

4.6 Eligibility (Attendance to Appear for the End Examination)

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

For INDUSTRIAL TRAINING:

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

4.7 Readmission

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

a) (i) Within 15 days after commencement of class work in any semester (Except Industrial Training).
   (ii) For Industrial Training: before commencement of the Industrial training.
b) Within 30 days after commencement of class work in any year (including D. Pharmacy course or first year course in Engineering and Non-Engineering Diploma streams). Otherwise, such cases shall not be considered for readmission for that semester / year and are advised to seek readmission in the next subsequent eligible academic year.
c) The percentage of attendance of the readmitted candidates shall be calculated from the first day of beginning of the regular class work for that year / Semester,

as officially announced by CTE/SBTET but not from the day on which he/she has actually reported to the class work.

4.8 Scheme of Evaluation

a) First Year

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

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

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

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

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

4.9 Internal Assessment Scheme

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

S. No.	Type of Assessment	Weightage Assigned
(i)	Testing of knowledge through mid-examination for year/sem as (Mid-1+Mid-2+Mid3) or (Mid-1 + Mid-2)	40
(ii)	Assignments	5
(iii)	*Dynamic Learning activities : Project Work/ Seminar/Tech-fest/Group Discussion, Quizzes etc./Extra-curricular activities/NSS/NCC/ IPSGM/Cleaning & Greening of Campus etc.*	*5*
	T O T A L	50

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

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

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

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

b) Practical Courses:

(i) **Drawing Courses:**

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

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

- For first year engineering drawing each unit test will be conducted for a duration of 2 hours with maximum marks of 40.
- (Part - A: 4 questions x 5 marks = 20 Marks; Part –B: 2 questions x 10 marks = 20 marks).
- For the semester drawing examinations, Two Unit tests shall be conducted as per the Board End Examination Question Paper Pattern.
- All Drawing exercises are to be filed in serial order and secured for further scrutiny by a competent authority

(ii) Laboratory Courses:

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

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

i. Instruction (teaching) in laboratory courses (except for the course on Drawing) here after shall be task/competency based as delineated in the Laboratory sheets, prepared by SBTET, AP & NITTTR- ECV and posted in SBTET website.

ii. Internal assessment for Laboratory shall be done on the basis of task/s performed by the student as delineated in the laboratory sheets, prepared by SBTET, AP & NITTTR- ECV and posted in AP, SBTET website.

iii. Question paper for End semester Evaluation shall also be task/s based and shall be prepared and distributed by SBTET as done in case of theory courses be prepared as per SBTET rules in vogue.

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

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

i) Nearby Industry

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

iii) Govt / University Engg College.

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

Internal examiner shall be the person concerned with internal assessment as in (c) above. The end examination shall be held along with all theory papers in respect of drawing.

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

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

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

Assessment no	**Upon completion of**	**By**	**Based on**	**Max Marks**
1	12 weeks	1.The faculty concerned (Guide) and 2. Training in charge (Mentor) of the industry	Learning outcomes as given in the scheme of assessment ,for Industrial Training	120
2	22 weeks			120
3. Final summative Evaluation	24 week	1.The faculty member concerned, 2.HoD concerned and 3.An external examiner	1.Demonstration of any one of the skills listed in learning outcomes	30
			2.Training Report	20
			3.Viva Voce	10
			TOTAL	**300**

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

4.10 Minimum Pass Marks

a) Theory Examination:

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

b) Practical Examination:

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

C) Industrial Training:

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

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

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

4.11. Provision for Improvement

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

a) Improvement is allowed in any 4 (Four) Courses of the Diploma.
b) The student can avail of this improvement chance **ONLY ONCE**, that too within the succeeding two examinations after the completion of Diploma. However, the duration including Improvement examination shall not exceed **FIVE** years from the year of first admission.
c) No improvement is allowed in Practical / Lab Courses or Project work or Industrial Training assessment. However, improvement in drawing Course(s) is allowed.
d) If improvement is not achieved, the marks obtained in previous Examinations hold good.
e) Improvement is not allowed in respect of the candidates who are punished under Mal-practice in any Examination.
f) Examination fee for improvement shall be paid as per the notification issued by State Board of Technical Education and Training from time to time.
g) All the candidates who wish to appear for improvement of performance shall deposit the original Marks Memos of all the years / Semesters and also original Diploma Certificate to the Board. If there is improvement in performance of the current examination, the revised Memorandum of marks and Original Diploma Certificate will be issued, else the submitted originals will be returned.

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

A) For Diploma Courses of 3 Years duration

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

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

candidate who could not pay the first year examination fee has to pay the promotion fee as prescribed by State Board of Technical Education and Training, AP from time to time before commencement of 3rd semester.

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

iii) A candidate shall be promoted to 4th semester provided he/she puts the required percentage of attendance in the 3rd semester and pay the examination fee. A candidate, who could not pay the 3rd semester exam fee, has to pay the promotion fee as prescribed by State Board of Technical Education and Training AP from time to time before commencement of 4th semester. A candidate is eligible to appear for the 4th semester examination if he/she puts the required percentage of attendance in the 4th semester and pays the examination fee.

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

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

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

For IVC & ITI Lateral Entry students:

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

ii) A candidate shall be promoted to 4th semester provided he/she puts the required percentage of attendance in the 3rd semester and pay the examination fee. A candidate, who could not pay the 3rd semester exam fee, has to pay the promotion fee as prescribed by State Board of Technical Education and Training AP from time to time before commencement of 4th semester.

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

ii) A candidate shall be promoted to 5th semester provided he / she puts the required percentage of attendance in the 4th semester and pays the examination

fee. A candidate, who could not pay the 4th semester examination fee, has to pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 5th semester.

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

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

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

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

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

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

iv. A candidate shall be promoted to 5th semester industrial training provided he / she puts the required percentage of attendance in the 4th semester and pays the examination fee. A candidate, who could not pay the 4th semester examination fee, has to pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 5th semester.
v. Promotion from 5th to 6th semester is automatic (i.e., from 1st spell of Industrial Training to 2nd spell) provided he/she puts the required percentage of attendance, which in this case ie.,90 % of attendance and attends for the VIVA-VOCE examination at the end of training.
vi. A candidate shall be promoted to 7th semester provided he / she puts the required percentage of attendance in the 6th semester and pays the examination fee. A candidate, who could not pay the 6th semester examination fee, has to pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 7th semester.

vii. A candidate shall be promoted to 7th semester of the course provided he/she has successfully completed both the spells of Industrial Training.

A candidate is eligible to appear for 7th semester examination if he/she

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

For IVC & ITI Lateral Entry students:

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

C) For Diploma Courses of 3 ½ Years duration (BM):

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

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

ii. A candidate shall be promoted to 3rd semester if he/she puts the required percentage of attendance in the first year and pays the examination fee. A candidate who could not pay the first year examination fee has to pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 3rd semester.

iii. A candidate shall be promoted to 4th semester provided he/she puts the required percentage of attendance in the 3rd semester and pay the examination fee. A candidate who could not pay the 3rd semester examination fee, has to pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 4th semester.

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

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

For IVC & ITI Lateral Entry Students:

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

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

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

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

For IVC & ITI Lateral Entry students:

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

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

A candidate who could not pay the 5th semester examination fee, has to pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 6th semester.

A candidate is eligible to appear for 6th semester examination

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

IVC & ITI Lateral Entry students:

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

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

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

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

For IVC & ITI Lateral Entry students:

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

4.13. Students Performance Evaluation

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

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

4.14. EXAMINATION FEE SCHEDULE:

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

4.15. Structure of Examination Question Paper:

I. Formative assessment (Internal examination)

a) For theory Courses:

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

Part A contains five questions and carries 16 marks. Among these five questions first question consists of four objective items like one word or phrase answer/filling-in the blanks/true or false etc with one mark for each question. The other four questions are short answer questions and carry three marks each.

Part B carries 24 marks and consists of three questions with internal choice ie., Either/Or type , and each question carries 8 marks.

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

b) For drawing Courses:

For I year:

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

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

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

The sum of marks obtained in 3-unit test marks shall be reduced to 20 marks for arriving at final sessional marks. Remaining 20 marks are awarded by the Course teacher based on the student's performance during regular class exercise.

For semester: Two-unit tests with duration of 90 minutes and for maximum marks of 40 marks shall be conducted. The sum of marks obtained in 2-unit test marks shall be reduced to 20 marks for arriving at final sessional marks. Remaining 20 marks are awarded by the Course teacher based on the student's performance during regular class exercise.

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

II. Summative assessment (End examination)

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

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

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

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

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

Section 'A' with max marks of 20, contains four (4) questions. All questions in section 'A' are to be answered to the scale and each carries 5 marks, ie. 4 x 5=20.

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

c) **Practical Examinations**
For Workshop practice and Laboratory Examinations, Each student has to pick up a question paper distributed by Lottery System.

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

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

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

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

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

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

4.16. ISSUE OF MEMORONDUM OF MARKS

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

4.17. MAXIMUM PERIOD FOR COMPLETION OF DIPLOMA PROGRAMMES:

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

4.18. ELIGIBILITY FOR AWARD OF DIPLOMA

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

i. He / She pursued a course of study for not less than 3 / 3 ½ academic years & not more than 6 / 7 academic years.
ii. He / she have completed all the Courses.
Students who fail to fulfil all the academic requirements for the award of the Diploma within 6 / 7 academic years from the year of admission shall forfeit their seat in the course & their seat shall stand cancelled.

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

i. He / She pursued a course of study for not less than 2 / 2 ½ academic years & not more than 4 / 5 academic years.
ii. He / she has completed all the Courses.
Students who fail to fulfil all the academic requirements for the award of the Diploma within 4 / 5 academic years from the year of admission shall forfeit their seat in the course & their seat shall stand cancelled.

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

A) FOR ISSUE OF PHOTO COPIES OF VALUED ANSWER SCRIPTS

I. A candidate desirous of applying for Photo copy of valued answer script/s should apply within prescribed date from the date of the declaration of the result.
II. Photo copies of valued answer scripts will be issued to all theory Courses and Drawing Course (s).
III. The Photo copy of valued answer script will be dispatched to the concerned candidate's address as mentioned in the application form by post.
IV. No application can be entertained from third parties.

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

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

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

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

I. **RE-COUNTING**

The Officer of SBTET will verify the marks posted and recount them in the already valued answer script. The variations if any will be recorded separately, without making any changes on the already valued answer script. The marks awarded in the original answer script are maintained (hidden).

II. RE-VERIFICATION

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

(ii) Initially single member shall carry out the re-verification.

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

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

(v) If the 2-Tier evaluation confirms variation in marks as more than 12% of maximum marks, the variation is considered as follows:

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

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

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

(vii) After Re-verification of valued answer script the same or change if any therein on Re-verification, will be communicated to the candidate.

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

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

4.20. Mal Practice Cases:

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

4.21. Discrepancies/ Pleas:

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

4.22. Issue of Duplicate Diploma

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

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

4.23. Issue of Migration Certificate and Transcripts:

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

4.24. General

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

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SCHEME OF INSTRUCTIONS AND EXAMINATION
CURRICULUM-2023
(FIRST YEAR)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Year	Scheme Of Examinations			
		Theory	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-101	English-I	3	-	90	3	20	80	100
AIM-102	Engineering Mathematics - I	5	-	150	3	20	80	100
AIM-103	Engineering Physics 3	3	-	90	3	20	8080	100
AIM-104	Engineering Chemistry and Environmental studies	3	-	90	3	20	80	100
AIM-105	Basics of Computers, Artificial Intelligence & Machine Learning	5	-	150	3	20	80	100
AIM-106	C& Data Structures	5	-	150	3	20	80	100
PRACTICAL SUBJECTS								
AIM -107	Engineering Drawing		3	90	3	40	60	100
AIM -108	C& Data Structures Lab		6	180	3	40	60	100
AIM -109	Physics Lab		1.5	90	1.5	20	30	50
AIM -110	Chemistry Lab		1.5		1.5	20	30	50
AIM -111	Computer Fundamentals Lab		3	90	3	40	60	100
	Activities		**3**	**90**				
	Total	**24**	**18**	**1260**	**-**			**1000**

AIM-101,102,103,104,107,109,110,111 Common with CM Branch.

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SCHEME OF INSTRUCTIONS AND EXAMINATION
CURRICULUM-2023 (III Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Semester	Scheme Of Examinations			
		Theory	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-301	Mathematics –II	4		60	3	20	80	100
AIM-302	Java Programming	4	-	60	3	20	80	100
AIM-303	Operating systems	4	-	60	3	20	80	100
AIM-304	Digital Electronics & Computer Organization	5	-	75	3	20	80	100
AIM-305	DBMS	5	-	75	3	20	80	100
PRACTICAL SUBJECTS								
AIM-306	Java Programming Lab	-	6	90	3	40	60	100
AIM-307	Computer Networking & Cyber Security Lab	-	3	45	3	40	60	100
AIM-308	DBMS Lab	-	4	60	3	40	60	100
AIM-309	Android Programming Lab		4	60	3	40	60	100
	ACTIVITIES		3	45				
	Total	22	20	630		260	640	900

AIM-301,303,305,308 Common with CM Branch.
AIM-302,306 Common with CM-404, 407 Branch respectively.
AIM-307 Common with CM-409
AIM-309 Common with CM-506

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SCHEME OF INSTRUCTIONS AND EXAMINATION
CURRICULUM-2023
(IV Semester)

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

AIM-401,406 is common with CM-402,406
AIM-402,407 is common with CM-505,507
AIM-404 is common with CM-401
AIM-408 is common with CM-408

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SCHEME OF INSTRUCTIONS AND EXAMINATION
CURRICULUM-2023
(V Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Semester	Scheme Of Examinations			
		Theory	Practi-cals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-501	Industrial Management and Entrepreneurship	5	-	75	3	20	80	100
AIM-502	BigData& Cloud Computing	5	-	75	3	20	80	100
AIM-503	Natural Language Processing	5	-	75	3	20	80	100
AIM-504	Internet of Things	5	-	75	3	20	80	100
AIM-505	Artificial Neural Networks & Deep Learning	3	-	45	3	20	80	100
PRACTICAL SUBJECTS								
AIM-506	NLP lab using Python	-	4	60	3	40	60	100
AIM-507	Machine Learning Lab	–	6	90	3	40	60	100
AIM-508	Life Skills	-	3	45	3	40	60	100
AIM-509	Project work	-	3	45	3	40	60	100
	ACTIVITIES		**3**	**45**				
	Total	**23**	**19**	**630**	**-**	**260**	**640**	**900**

AIM-501,502,504 is common with CM-501,502,504
AIM-508,509 is common with CM-508,509

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

SCHEME OF INSTRUCTIONS AND EXAMINATION
CURRICULUM-2023
(VI Semester)
AIM-601 Industrial Training

SI. No.	Subject	Duration	Scheme of evaluation		
			Item	Nature	Max. Marks
1	Industrial Training	6 months	1.First Assessment at Industry (After 12 Weeks)	Assessment of learning outcomes by both the faculty and training mentor of the industry	120
			2.Second Assessment at the Industry (After 22 weeks))	Assessment of learning outcomes by both the faculty and training mentor of the industry	120
			Final Summative assessment at institution level	Training Report	20
				Demonstration of any one of the skills listed in learning outcomes	30
				Viva Voce	10
TOTAL MARKS					300

- The candidate shall put a minimum of 90% attendance during Industrial Training.
- If the student fails to secure 90% attendance during industrial training, the student shall reappear for 6 months industrial training.
- Formative assessment at industry level shall be carried out by the Mentor from of the industry, where the student is undergoing training and the faculty in charge (Guide) from the concerned section in the institution.

- The Industrial training shall carry 300 marks and pass marks is 50% in assessments at industry (first and second assessment) and final summative assessment at institution level put together i.e. 150 marks out of 300 marks.
- If the student fails to secure 50% marks in final summative assessment at institution level, the student should reappear for final summative assessment in the subsequent board examination.
- Final Summative assessment at institution level is done by a committee including Head of the section, External examiner and Faculty members who assessed the students during Industrial Training as members.

LEARNING OUTCOMES – SCHEM OF EVALUATION (Two Online Certificate courses):

TRAINING MODULE NO.	TOPIC	LEARNING OUTCOMES (In-house training)	MARKS
First 3 Months/ 12 weeks	1) Registration at Nptel/Swayam/Moocs/course era/lectera/caltech/oxford/hckerrank/udemy … etc.,	i)Learning ii)Mini Application development iii)Report preparation iv)1st Assessment	120
Next 3 Months/ 12 Weeks	1) Registration at Nptel/Swayam/Moocs/course era/lectera/caltech/oxford/hckerrank/udemy … etc.,	i)Learning ii)Mini Application development iii)Report preparation iv)2st Assessment	120
External Evaluation	Seminar on two reports/viva	Evaluation by GUIDE/Co - Examiner,HOD and External Examiner	60
		TOTAL	300

FIRST YEAR

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SCHEME OF INSTRUCTIONS AND EXAMINATION
CURRICULUM-2023
(FIRST YEAR)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Year	Scheme Of Examinations			
		Theory	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-101	English-I	3	-	90	3	20	80	100
AIM-102	Engineering Mathematics - I	5	-	150	3	20	80	100
AIM-103	Engineering Physics 3	3	- 203	333 90	3	20	8080	100
AIM-104	Engineering Chemistry and Environmental studies	3	-	90	3	20	80	100
AIM-105	Basics of Computers, Artificial Intelligence & Machine Learning	5	-	150	3	20	80	100
AIM-106	C& Data Structures	5	-	150	3	20	80	100
PRACTICAL SUBJECTS								
AIM -107	Engineering Drawing		3	90	3	40	60	100
AIM -108	C& Data Structures Lab		6	180	3	40	60	100
AIM -109	Physics Lab		1.5	90	1.5	20	30	50
AIM -110	Chemistry Lab		1.5		1.5	20	30	50
AIM -111	Computer Fundamentals Lab		3	90	3	40	60	100
	Activities		**3**	**90**				
	Total	**24**	**18**	**1260**	**-**			**1000**

AIM-101,102,103,104,107,109,110,111 Common with CM Branch.

AIM-101: English

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

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

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

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

CO-PO Matrix

<table>
<tr><td>Course Code

Common-101</td><td colspan="3">Course Title: English

Number of Course Outcomes: 5</td><td colspan="2">No. of Periods: 90</td></tr>
<tr><td rowspan="2">POs</td><td rowspan="2">Mapped CO No.</td><td colspan="2">CO Periods Addressing PO in Column 1</td><td rowspan="2">Level of Mapping

(1,2,3)</td><td rowspan="2">Remarks</td></tr>
<tr><td>Number</td><td>Percentage</td></tr>
<tr><td>PO1</td><td></td><td colspan="4" rowspan="4">Not directly Applicable for English course, however, the language activities make use of the content from Science and Technology relevant to the programme to enhance English communication skills.</td></tr>
<tr><td>PO2</td><td></td></tr>
<tr><td>PO3</td><td></td></tr>
<tr><td>PO4</td><td></td></tr>
<tr><td>PO5</td><td>CO5</td><td>16</td><td>18%</td><td>Level 1</td><td rowspan="3">Up to 20%: Level 1

21%-50%: Level 2

>50%: Level 3</td></tr>
<tr><td>PO6</td><td>CO1, CO2, CO3, CO4,</td><td>52</td><td>58%</td><td>Level 3</td></tr>
<tr><td>PO7</td><td>CO1, CO2, CO3,</td><td>22</td><td>24%</td><td>Level 2</td></tr>
</table>

	CO4,CO5				

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

Learning Outcomes

1. English for Employability

Perceive the need for improving communication in English for employability
Use adjectives and articles effectively while speaking and in writing
Write simple sentences

2. Living in Harmony

Develop positive self-esteem for harmonious relationships
Use affixation to form new words
Use prepositions and use a few phrasal verbs contextually

3. Connect with Care

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

4. Humour for Happiness

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

5. Never Ever Give Up!

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

6. Preserve or Perish

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

7. The Rainbow of Diversity

Appraise and value other cultures for a happy living in multi-cultural workspace
Understand the usage of different types of sentences
Ask for or give directions, information, instructions
Use language to express emotions in various situations

Write letters in various real life situations

8. New Challenges – Newer Ideas

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

9. The End Point First!

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

10. The Equal Halves

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

11. Dealing with Disasters

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

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

Reference Books:

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

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

Time Schedule : C23-Common- 101 : ENGLISH

Chapter. No	Title of the Unit	Periods allotted	Weightage of Marks	No. of Short answer questions	No. of Long Answer questions	Mapping of COs
1	English for Employability	8	16	2	1	CO1, CO2, CO3, CO4, CO5
2	Living in Harmony	8			2	CO1, CO2, CO3, CO4, CO5
3	Connect with Care	8	26	2		CO1, CO2, CO3, CO4, CO5
4	Humour for Happiness	8				CO1, CO2, CO3, CO4, CO5

5	Never Ever Give Up!	8	10	1	1	CO1, CO2, CO3, CO4, CO5
6	Preserve or Perish	9	23		2	CO1, CO2, CO3, CO4, CO5
7	The Rainbow of Diversity	8		2		CO1, CO2, CO3, CO4, CO5
8	New Challenges -Newer Ideas	8	19		1	CO1, CO2, CO3, CO4, CO5
9	The End Point First	8		1		CO1, CO2, CO3, CO4, CO5
10	The Equal Halves	8	16	1	1	CO1, CO2, CO3, CO4, CO5
11	Dealing with Disaster	9		1		CO1, CO2, CO3, CO4, CO5
	Total	**90**	**110**	**30**	**80**	

C23-Common-101 :English : Bifurcation of Syllabus for UNIT TESTS 1,2,3			
Unit Test	**Lessons / Chapters**	**Grammar / Language aspects** **(Topics or Short Answer questions)**	**Writing Skills** **(Topics for Long answer/ Essay Questions)**

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

AIM-102

ENGINEERING MATHEMATICS-I

(Common to all Branches)

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

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

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

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

Learning Outcomes:

UNIT - I

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

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

Explain Relations and Functions – examples

Find Domain & Range of functions – simple examples.

Define one-one and onto functions.

Find the inverse of a function – simple examples.

Define rational, proper and improper fractions of polynomials.

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

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

Define a matrix and order of a matrix.

State various types of matrices with examples (emphasis on 3rd order square matrices). Compute sum, difference, scalar multiplication and product of matrices. Illustrate the properties of these operations such as commutative, associative and distributive propertieswith examples and counter examples.

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

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

Define determinant of a square matrix; minor, co-factor of an element of a3x3 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.

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.

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

UNIT - II

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

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

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

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

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

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

Solve simple problems on compound angles.

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

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

Solve simple problems using the multiple and submultiple formulae.

Syllabus for Unit test-I completed

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

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

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

Define inverses of six trigonometric functions along with their domains and ranges.
Derive relations between inverse trigonometric functions so that the given inverse trigonometric function can be expressed in terms of other inverse trigonometric functions with examples.
State various properties of inverse trigonometric functions and identities like

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

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

to solve Simple problems.

Explain what is meant by solution of trigonometric equations and find the general solutionsof sin x=k, cos x =k and tan x=k with appropriate examples.
Solve models of the type a $\sin^2$ x + b sin x +c=0 and a sin x + b cos x=c.
State sine rule, cosine rule, tangent rule and projection rule and solve a triangle using these formulae.
List various formulae for the area of a triangle with examples.
Define a complex number, its modulus, conjugate, amplitude and list their properties.
Define arithmetic operations on complex numbers with examples.
Represent the complex number in various forms like modulus-amplitude (polar) form, Exponential (Euler) form with examples.

UNIT - III

Coordinate Geometry

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

L.O. 3.1 Write different forms of a straight line – general form, point-slope form, slope- intercept form, two-point form, intercept form and normal form (or perpendicular form).
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.
Define locus of a point and circle.
Write the general equation of a circle and find its centre and radius.
Find the equation of a circle, given (i) centre and radius, (ii)two ends of the diameter (iii) three non collinear points of type (0,0) (a,0), (0, b).
Define a conic section - Explain the terms focus, directrix, eccentricity, axes and latus-rectum of a conic with illustrations.
Find the equation of a conic when focus, directrix and eccentricity are given.
Describe the properties of Parabola, Ellipse and Hyperbola in standard forms whose axes are along the co-ordinate axes and solve simple examples on these conics.

Syllabus for Unit test-II completed

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

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

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

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

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

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

derivative of a function.

Explain the significance of derivative in scientific and engineering applications.

Find the derivative of standard algebraic, logarithmic, exponential and trigonometricfunctions using the first principle.

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

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

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

Explain the method of differentiation of parametric functions with examples.

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

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

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

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

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

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

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

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

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

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

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

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

Apply the concept of derivatives to find the errors and approximations - simpleproblems.

Syllabus for Unit test-III completed

CO/PO – Mapping

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

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

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

For PO5: Appropriate quiz programmes may be conducted at intervals and duration as decided by concerned faculty.

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

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

PO- CO – Mapping strength

PO No	Mapped with CO no	CO periods addressing PO in column I		Level (1,2 or 3)	Remarks
		No	%		
1	CO1, CO2, CO3, CO4, CO5	150 (31+44+23+34+18)	100%	3	>40% Level 3 Highly addressed 25% to 40% Level 2 Moderately addressed 5% to 25% Level 1 Low addressed <5% Not addressed
2	CO1, CO2, CO3, CO4, CO5	80 (8+23+12+22+15)	53.3%	3	
3	CO1, CO2, CO3, CO4, CO5	61 (9+14+9+14+15)	40.6%	3	
4	CO1, CO2, CO3, CO4, CO5	61 (14+9+9+14+15)	40.6%	3	
PSO 1	CO1, CO2, CO3, CO4, CO5	150 (31+44+23+34+18)	100%	3	
PSO 2	CO1, CO2, CO3, CO4, CO5	62 (10+14+9+14+15)	41.3%	3	
PSO 3	CO1, CO2, CO3, CO4, CO5	62 (10+14+9+14+15)	41.3%	3	

COURSE CONTENT

Unit-I

Algebra

1. Functions:

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

2. Partial Fractions:

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

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

3. Matrices:

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

Unit-II

Trigonometry

4. Trigonometric ratios:

Definition of trigonometric ratios of any angle, values of trigonometric ratios at specified values, draw graphs of trigonometric functions, periodicity of trigonometric functions.

5. Compound angles:

Formulas of sin(A±B), cos(A±B), tan(A±B), cot(A±B), and related identities.

6. Multiple and sub multiple angles:

Formulae for trigonometric ratios of multiple angles 2A, 3A and sub multiple angle A/2.

7. Transformations:

Transformations of products into sums or differences and vice versa.

8. Inverse trigonometric functions:

Definition, domains and ranges-basic properties.

9. Trigonometric equations:

Concept of a solution, principal value and general solution of trigonometric equations:
Sinx =k, cosx= k, tanx =k, where k is a constant. Solutions of simple quadratic equations and equations of type a sin x + b cos x=c.

10. Properties of triangles:

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

11. Complex Numbers:

Definition of a complex number, modulus, conjugate and amplitude of a complex number -

UNIT-III

Coordinate geometry

12 **Straight lines:** Various forms of a straight line - Angle between two lines, perpendicular distance from a point, intersection of non-parallel lines and distance between parallel lines.

13. **Circle:** Locus of a point, Circle definition - Circle equation given (i) centre and radius, (ii)two ends of a diameter (iii) three non-collinear points of type (0,0), (a,0), (0, b) - General equationof a circle –its centre and radius.

14. Definition of a conic section - Equation of a conic when focus, directrix and eccentricityare given - Properties of parabola, ellipse and hyperbola in standard forms.

UNIT-IV

Differential Calculus

15. **Concept of Limit-** Definition and Properties of Limits and Standard Limits - Continuity of a function at a point.

16. **Concept of derivative-** Definition (first principle)- different notations - Derivatives of standard algebraic, logarithmic, exponential, trigonometric, inverse trigonometric, hyperbolic and inverse hyperbolic functions - Derivatives of sum, difference, scalar multiplication, product, quotient of functions - Chain rule, derivatives of parametric functions, derivatives of implicit functions, logarithmic differentiation - Second order derivatives - Functions of several variables, first and second order partial derivatives.

UNIT-V

Applications of Derivatives

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

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

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

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

Textbook:

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

Reference Books:

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

TIME SCHEDULE

Chapter. No	Chapter	No. of Periods	Marks Allotted	Short type	Essay type	COs mapped
Unit - I: Algebra						
1	Functions	6	3	1	0	CO1
2	Partial Fractions	5	3	1	0	CO1
3	Matrices and Determinants	20	16	2	1	CO1
Unit - II: Trigonometry						
4	Trigonometric Ratios	2	0	0	0	CO2
5	Compound Angles	5	3	1	0	CO2
6	Multiple and Submultiple angles	8	3	1	0	CO2
7	Transformations	6	5	0	1/2	CO2
8	Inverse Trigonometric Functions	6	5	0	1/2	CO2
9	Trigonometric Equations	6	5	0	1/2	CO2
10	Properties of triangles	5	5	0	1/2	CO2
11	Complex Numbers	6	3	1	0	CO2
Unit III: Co-ordinate Geometry						
12	Straight Lines	5	3	1	0	CO3
13	Circles	6	5	0	1/2	CO3
14	Conic Sections	12	5	0	1/2	CO3
Unit – IV: Differential Calculus						
15	Limits and Continuity	6	3	1	0	CO4
16	Differentiation	28	23	1	2	CO4
Unit – V: Applications of Derivatives						
17	Geometrical Applications	4	5	0	1/2	CO5
18	Physical Applications	6	5	0	1/2	CO5
19	Maxima and Minima	4	5	0	1/2	CO5
20	Errors and Approximations	4	5	0	1/2	CO5
	Total	150	110	10	8	
			Marks	30	80	

C-23 common-102

Unit Test Syllabus

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

C-23
ENGINEERING PHYSICS

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

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

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

MATRIX SHOWING MAPPING OF COURSE OUTCOMES WITH PROGRAMME OUTCOMES

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

Matrix showing mapping of Course Outcomes with Program Outcomes

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

CO-PO Mapping Strength

Course code Common - 103	**Engineering Physics No of Course Objectives : 4**				**No of periods 90**
Pos	Mapped with CO No	riods addressing PO in Col 1 NO	%	1,2,3	remarks
PO1	CO1,CO2,CO3,CO4	44	48.9 %	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, CO4	11	12.2%	1	
PO3	CO1, CO2,CO3, CO4	10	11.1%	1	
PO4	CO1, CO2,CO4	8	8.9%	1	
PO5	CO2,CO3, CO4	8	8.9%	1	
PO6					
PO7	CO1, CO2, CO3, CO4	9	10.0%	1	

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

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

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

Learning outcomes

Upon completion of the course the student shall be able to

Understand the concept of units and measurements

Explain the concept of units

Define the terms
a) Physical quantity, b) Fundamental physical quantities and
c) Derived physical quantities
Define unit
Define fundamental units and derived units
State SI units with symbols for fundamental and some derived quantities
State Multiples and Submultiples in SI system
State rules of writing S.I units
State advantages of SI units
What are direct and indirect measurements.
Define accuracy and least count
Define error in measurement
Define absolute, relative and percentage errors with their formulae
Solve simple problems on absolute, relative and percentage errors

Understand the concepts of statics

Explain the concept of Vectors
Define scalar and vector quantities with examples
Represent vectors geometrically
Define the types of vectors (equal, negative, unit, co-initial, co-planar, position vector)
Resolve the vector into rectangular components
State and explain triangle law of addition of vectors
Define concurrent forces, co-planar forces and equilibrant.
State and explain Lami's theorem
State the parallelogram law of addition of forces with diagram.
Write the expressions for magnitude and direction of resultant (no derivation)
Illustrate parallelogram law with examples (i) flying of bird and (ii) working of sling.
Define moment of force and couple.
Write the formulae and S.I units of moment of force and couple.
Solve simple problems on (i)Resolution of force and
(ii) Parallelogram law of forces (finding R,α and θ).

Understand the concepts of Gravitation

State and explain Newton's universal law of gravitation.
Define G and mention its value.
Explain the acceleration due to gravity (g)
Explain the factors affecting the value of g
Derive the relationship between g and G.

3.6. State and explain the Kepler's laws of planetary motion
Define a satellite.
What are natural and artificial satellites? Give examples.
Define orbital velocity and write its formula.
Define escape velocity and write its formula.
Write a brief note on Polar satellites.
Write a brief note on Geo-stationary satellites.
Mention the applications of artificial satellites.

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

Understand the concepts of Energy.

Define work done and energy. Mention their SI units.
List various types of energy.

Define P.E with examples. Write its equation.
Define K.E with examples. Write its equation.
Derive relationship between K.E and momentum.
State the law of conservation of energy. Give various examples.
Write a brief note on solar energy.
Explain the principle of solar thermal conversion.
Explain the principle of photo voltaic effect
Solve simple problems on (i) work done (ii) P.E & K.E and (iii) Relation between K.E & momentum.

Understand the concepts of thermal physics

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

Understand the concepts of Sound

Define the term sound
Define longitudinal and transverse waves with one example each
Explain the factors which affect the velocity of sound in air
Distinguish between musical sound and noise
Explain noise pollution and state SI unit for intensity of sound
Explain sources of noise pollution
Explain effects of noise pollution
Explain methods of minimizing noise pollution
Define Doppler effect.
List the Applications of Doppler effect
Define reverberation and reverberation time
Write Sabine's formula and name the physical quantities in it.
Define echoes and explain the condition to hear an echo.
Mention the methods of reducing an echo
Mention the applications of an echo
What are ultra sonics
Mention the applications of ultra sonics, SONAR
Solve simple problems on echo

Understand the concepts of Electricity and Magnetism

Explain the concept of P.D and EMF
State Ohm's law and write the formula
Explain Ohm's law
Define resistance and specific resistance. Write their S.I units.
State and explain Kichoff's first law.
State and explain Kirchoff's second law.
Describe Wheatstone bridge with legible sketch.

Derive an expression for balancing condition of Wheatstone bridge.
Describe Meter Bridge experiment with necessary circuit diagram.
Write the formulae to find resistance and specific resistance in meter bridge
Explain the concept of magnetism
What are natural and artificial magnets (mention some types)
Define magnetic field and magnetic lines of force.
Write the properties of magnetic lines of force
State and explain the Coulomb's inverse square law of magnetism
Define magnetic permeability
Define para, dia, ferro magnetic materials with examples
Solve simple problems on (i) Ohm's law (ii) Kirchoff's first law (iii) Wheatstone bridge (iv) meter bridge and (v) Coulomb's inverse square law

Understand the concepts of Modern physics

State and explain Photo-electric effect.
Write Einstein's Photo electric equation and name the physical quantities in it.
State laws of photo electric effect
Explain the Working of photo electric cell
List the Applications of photoelectric effect
Recapitulate refraction of light and its laws
Define critical angle
Explain the Total Internal Reflection
Explain the principle and working of Optical Fiber
List the applications of Optical Fiber
Explain the energy gap based on band structure
Distinguish between conductors, semiconductors and insulators based on energy gap
Define doping
Explain the concept of hole
Explain the types of semiconductors : Intrinsic and extrinsic
Explain n-type and p-type semiconductors
Mention the applications of semiconductors
Define superconductor and superconductivity
List the applications of superconductors
Nanotechnology definition, nano materials and applications

COURSECONTENT

1. Units and measurements

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

2. Statics

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

3. Gravitation

Newton's law of gravitation and G – Concept of acceleration due to gravity (g) – Factors affecting the value of g – Relation between g and G- Kepler's laws – Satellites : Natural

and artificial – Orbital velocity and escape velocity – Polar and geostationary satellites – Applications of artificial satellites – Problems.

4. **Concepts of energy**

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

5. **Thermal physics**

   Modes of transmission of heat – Expansion of Gases - Boyle's law – Absolute scale of temperature - Thermometric scales and their inter conversion - Charle's law - Gay-Lussac's law - Ideal gas equation - Universal gas constant (R) - Problems.

6. **Sound**

   Sound - Nature of sound - Types of wave motion, Longitudinal and transverse – Factors affecting the velocity of sound in air - musical sound and noise - Noise pollution – Causes & effects - Methods of reducing noise pollution - Doppler effect - Echo- Reverberation -Reverberation time-Sabine 's formula – Ultrasonics & applications – SONAR - Problems.

7. **Electricity & Magnetism**

   Concept of P.D and EMF - Ohm's law and explanation-Specific resistance - Kirchoff's laws – Wheat stone's bridge - Meter bridge.

   Natural and artificial magnets – magnetic field and magnetic lines of force – Coulomb's inverse square law – Permeability – Magnetic materials – Para, dia, ferro – Examples – Problems.

8. **Modern Physics**

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

REFERENCES

1. Intermediate physics - Volume - I & 2 — Telugu Academy (English version)
2. Unified physics Volume 1, 2, 3 and 4 — Dr. S.L Guptha and Sanjeev Guptha
3. Concepts of Physics, Vol 1 & 2 — H.C. Verma
4. Text book of physics Volume I & 2 — Resnick & Halliday
5. Fundamentals of physics — Brijlal & Subramanyam
6. Text book of applied physics — Dhanpath Roy
7. NCERT Text Books of physics — Class XI & XII Standard
8. e-books/e-tools/websites/Learning Physics software/eLMS

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

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

Engineering Chemistry and Environmental Studies (C-23)

AIM-**104**

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

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

Course Objectives

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

Course outcomes

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

AIM-104	Engineering. Chemistry and Environmental studies No of Course Outcomes:5				No Of periods 90
POs	Mapped with CO No	CO periods addressing PO in Col NO. 1	%	Level 1,2,3	remarks
PO1	CO1,CO2,CO3	42	46.7 %	3	>40% level 3 (highly addressed) 25% to 40% level 2(moderately addressed) 5% to 25% level 1 (Low addressed) < 5%(not addressed)
PO2	CO2,CO3	16	17.8%	1	
PO3	CO4	12	13.3%	1	
PO4	CO4	6	6.7%	1	
PO5	CO5	14	15.5%	1	
PO6	-	-	-	-	
PO7	-	-	-	-	

COs-POs mapping strength (as per given table)

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

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

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

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

Time Schedule:

Chapter. No	Unit Title/Chapter	No of Periods	Weightage of marks	Question wise distribution		Mapped with CO
				Essay	Short	
1	Fundamentals of Chemistry	14	21	1½*	2	CO1
2	Solutions, Acids and Bases	16	21	1½*	2	CO1
3	Electrochemistry	12	13	1	1	CO2
4	Corrosion	8	13	1	1	CO2
5	Water Treatment	8	13	1	1	CO3
6	Polymers & Engineering materials.	12	13	1	1	CO4
7	Fuels	6	3	0	1	CO4
8	Environmental Studies	14	13	1	1	CO5
Total		90	110	8	10	

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

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

ENGINEERING CHEMISTRY AND ENVIRONMENTAL STUDIES

Atomic structure

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

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

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

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

Explain 1. Aufbau principle, 2. Pauli's exclusion principle 3. Hund's principle.

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

Explain the significance of chemical bonding.

Explain the Postulates of Electronic theory of valency.

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

dot method).

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

Solutions, Acids and Bases

Define the terms 1. Solution, 2. Solute and 3. Solvent.

Classify solutions based on solubility.

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

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

Define mole and solve numerical problems on mole concept.

Define molarity, normality and solve numerical problems on molarity and normality.

a) Calculate the Molarity or Normality, if weight of solute and volume of solution are given.

b) Calculate the weight of solute, if Molarity or Normality with volume of solution are given.

c) Problems on dilution to convert high concentrated solutions to low concentrated solutions.

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

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

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

Electrochemistry

Define the terms 1. Conductor 2. Semiconductor 3. Insulator, 4. Electrolyte 5. Non–electrolyte. Give two examples each.

Distinguish between Metallic conduction and Electrolytic conduction.

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

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

Distinguish between electrolytic cell and galvanic cell.

Define battery and list the types of batteries with examples.

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

Corrosion

Define the term corrosion.

state the Factors influencing the rate of corrosion.

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

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

Explain the methods of prevention of corrosion by

(a)Protective coatings (anodic and cathodic coatings).

(b) Cathodic protection (Sacrificial anode process and Impressed–voltage process).

5. 0 Water Treatment

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

Define and classify the hardness of water.

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

State the disadvantages of using hard water in industries.

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

Solve numerical problems on hardness.

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

Polymers & Engineering materials.

A) Polymers

Explain the concept of polymerization.

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

Define plastic. Explain a method of preparation and uses of the following plastics:

1. PVC 2. Teflon 3. Polystyrene 4. Nylon 6,6.

Define elastomers. Explain a method of preparation and applications of the following:

1. Buna- S 2. Neoprene.

B) Engineering Materials

Define an alloy. Write the composition and applications of the following:

1.Nichrome 2. Duralumin 3.Stainless Steel.

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

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

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

Fuels

Define the term fuel.

Classify the fuels based on occurrence.

Write the composition and uses of the following:

1. LPG 2. CNG 3.Biogas 4.Power alcohol

Write the commercial production of Hydrogen as future fuel. Give its advantages anddisadvantages.

ENVIRONMENTAL STUDIES

Explain the scope and importance of environmental studies.

Define environment. Explain the different segments of environment.

1.Lithosphere 2. Hydrosphere 3. Atmosphere 4. Biosphere

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 12. Producers 13. Consumers 14. Decomposers with examples.

State the renewable and non- renewable energy sources with examples.

State the uses of forest resources.

Explain the causes and effects of deforestation.

Define air pollution and explain its Global impacts 1. Greenhouse effect, 2. Ozone layer depletion and 3. Acid rain.

Define Water pollution. Explain the causes, effects and controlling methods of Water pollution.

Define e-Pollution, State the sources of e-waste. Explain its health effects and control methods.

Define Green Chemistry. Write the Principles and benefits of Green Chemistry.

COURSE CONTENT

ENGINEERING CHEMISTRY AND ENVIRONMENTAL STUDIES

1. Fundamentals of Chemistry

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

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

2. Solutions, Acids and Bases

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

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

3. Electrochemistry

Conductors, semiconductors, insulators, electrolytes and non-electrolytes – Electrolysis of fused

NaCl–Applications of electrolysis - Galvanic cell – Battery-Types- Dry Cell (Leclanche Cell), Lead-Storage battery- Lithium-Ion battery -Hydrogen-Oxygen Fuel cell.

4. **Corrosion**

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

5. **Water treatment**

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

6. **Polymers & Engineering materials**

   Polymers:

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

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

   Engineering Materials:

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

   Composite Materials- Properties and applications.

   Liquid Crystals- Properties and applications.

   Nano Materials- Properties and applications.

7. **Fuels**

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

8. **ENVIRONMENTAL STUDIES**

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

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

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

REFERENCE BOOKS

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

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

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Fundamentals of Computers	30	16	2	1	CO1,CO3, CO4
2.	Programming Methodology	20	13	1	1	CO2
3.	Operating System basics	25	26	2	2	CO1,CO3
4.	Computer Hardware and Networking Basics	35	29	3	2	CO1,CO4, CO5
5.	Emerging Trends in Computer Technologies	40	26	2	2	CO2,CO6
	Total	**150**	110	10	8	

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

	At the end of the course the student able to learn followg:

Course Outcomes	CO1	AIM-105.1	Explain computer fundamentals
	CO2	AIM-105.2	Explain various flowchart, algorithm methods
	CO3	AIM-105.3	Explain the importance of Basic Computer operating systems
	CO4	AIM-105.4	Analyse functioning of various Hardware components
	CO5	AIM-105.5	Explain Networking process in computers
	CO6	AIM-105.6	Explain basics of emerging technologies in the world

CO-PO/PSO Matrix:

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

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

Learning Outcomes:

1.0 Fundamentals of Digital Computer

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

2.0 Implement Programming Methodology.

State the different steps involved in problem solving.
Define algorithm.
List four characteristics of algorithm.
Define a program
Differentiate between program and algorithm.
State the steps involved in algorithm development.
Differentiate between algorithm and flowchart.
Develop algorithms for simple problems.
Draw the symbols used in flowcharts.
Draw flowcharts for simple problems.

3.0 Operating Systems basics

Describe the need for an operating system.
List the various operating systems used presently.
List and explain
Types of dos commands
Any 10 Internal Commands
Any 5 External Commands
Features of Windows desktop.
Components of a Window.
State the function of each component of a Window.
Describe the Method of starting a program using start button
Explain usage of maximize, minimize, restore down and close buttons.
State the meaning of a file ,folder.
Describe the Method of viewing the contents of hard disk drive using Explorer
Describe the Method of finding a file using search option.
Use control panel for
installing and uninstalling software
installing and uninstalling hardware
Changing the system date and time
Installing a printer
Explain Drive space using system tool option of Accessories group
Explain Disk defragmentation using System tools
Explain the procedure for changing resolution, color, appearance, screensaver options of the display

Computer Hardware and Networking Basics

Hardware Basics
Identify hardware used for I/P, O/P & inside computer case, system board components used for communication among devices
Software - 3 types of Software: ROM BIOS, OS, application software
Explain Functions of BIOS
Explain boot process
Explain POST and important beep codes
Describe about different connectors.

Networking Basics
Explain meaning of a computer network.
Describe the concept of a Local Area Network, Wide Area Network

Compare Internet and Intranet
Describe about internet service provider.
Explain the role of a modem in accessing the Internet.
Describe address format and IP address
What is browser and List various browsers
Explain the role of search engines with examples.
Explain Internet Security.

5.0 Emerging Trends in Computer Technology

Artificial Intelligence
Define AI
Types of AI
Current Trends in AI
Applications of AI

Machine Learning
Define Machine Learning
Compare Traditional Programming with Machine Learning
List the applications and key elements of Machine Learning
Introduction to Big data
Define and list sources of Big data
Evolution of data/big data
List and explain the characteristics of big data – the three V"s of big data
Describe Storing and selecting of Big Data
State the Need of Big Data
List types of tools used in Big Data
List applications of big data

Introduction to BlockChain Technology
Definition
Need for BlockChain Technology
List the Characteristics of BlockChain Technology
List the components of BlockChain Technology
Explain the Architecture of Blockchain
Define Public, private and Hybrid Blockchains
Define Transactions
State the purpose of Chaining Blocks
List the Applications of BlockChain Technology.

COURSE CONTENT

1.0 Fundamentals of Digital Computer

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

2.0 Programming Methodology.

Steps involved in problem solving - Define algorithm , Program - Characteristics of algorithm - Differentiate between program and algorithm- Steps involved in algorithm

development - Differentiate algorithm and flowchart - Algorithms for simple problems - Symbols used in flowcharts -Flowcharts for simple problems.

3.0 Understand Operating Systems

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

4.0 Computer Hardware and Networking Basics

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

5.0 Emerging Trends in Computer Technology

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

REFERENCE BOOKS

1. Information Technology - Curtin.
2. Computer Science Theory & Application - E. Balaguruswamy, B. Sushila
3. Introduction to Computers (Special Indian Edition) - Peter Norton
4. Big Data Basics part1 and 2 in www.mssqltips.com
5. Basics of AI & ML – Dr Dheeraj Mehrotra
6. Block Chain Technology and Applications – Dr Jogendra Kumar – kindle edition

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

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

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Introduction to C Language, I/O statements and operators in C	20	16	2	1	CO1,CO2
2.	Decision making Statements, Iterative Statements, Arrays and Strings	25	26	2	2	CO1,CO2,CO3
3.	Functions, Pointers, Structures and Unions	40	26	2	2	CO1,CO2,CO3
4.	Introduction to Data Structures	30	16	2	1	CO1,CO2,CO3
5.	Stacks, Queues and Trees	35	26	2	2	CO1,CO2,CO3, CO4,CO5
	Total	**150**	110	10	8	

Course Objectives	Up on 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. 3. To know the various types of Data Structures 4. To familiarize with the representation of Data Structures 5. Construct mathematical, logical and scientific problems and real-time applications using C-language

	Up on completion of the course the student shall be able to		
	CO1	AIM106.1	Develop, compile and debug programs using C-fundamentals and various operators in C language.

Course Outcomes	CO2	AIM106.2	Use decision-making statements, Arrays and Strings in C.
	CO3	AIM106.3	Analyze programs using pre-defined functions, Pointers, Structures and Unions
	CO4	AIM106.4	Explain Sorting, Searching and Dynamic memory allocation with creation of nodes.
	CO5	AIM106.5	Analyze the operations of stacks, queues and Trees.

Learning Objectives

1. Introduction to C-Language, I/O statements and Operators in C

Describe the structure of C-language program
Explain the steps involved in Editing, compiling, executing and debugging of C program
Describe character set, C-Tokens, Keywords, Identifiers, Constants, Variables
Classify Data Types and explain them with examples.
Explain declaration of constants and variables
Explain initializing values to variables in declaration
Explain getch(),getchar(), putch(),putchar()
Explain scanf(), printf(), character functions
Define operator, expression
Explain
Various arithmetic operators
Various relational operators
Various logical operators
Various assignment operators, increment and decrement operators
Conditional operators with an example
Bit-wise operators and explain each with an example
Special operators with examples
Precedence and Associativity of operators
Illustrate type conversion techniques

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

Explain decision making statements and its need in programming
Explain
Simple if and if-else statement with syntax and sample program
Nested if..else statements with syntax and sample program
if-else-if ladder with syntax and sample program
switch statement with syntax and sample program
Define Looping or Iteration
List and explain iterative statements with syntax and examples.
Compare different loop statements
Explain Nested loop statements.
Explain the usage of Null statement, goto, break and continue statements with loopstatements
Differentiate break and continue statements.
Define Array
Describe
Declaration and initialization of One Dimensional (1D) Array with syntax and sample programs.

Accessing the elements in 1D-Array with sample programs.
Explain declaration and initialization and usage of two Dimensional (2D) Arrays.
Illustrate the concept of arrays with sample programs on matrix addition, subtraction and matrix multiplication
Define String
Describe
Declare and initialize of String variables.
gets() and puts()
Explain about various String handling functions with sample programs.

3. Functions, Pointers, Structures and Unions

Define function
Need of user defined functions
Advantages of the functions
Return values and their types
Explain
Function declaration in programs
Functions with no arguments and no return values with sample programs
Functions with arguments with no return values with sample programs
Functions with arguments with return values with sample programs
Functions with no arguments with return values with sample programs
Recursion with sample programs
Passing arrays to functions with sample programs
Differentiate Local and External variables
Declaration and initialization of Pointers.
Define pointer
Accessing the address of a variable using & operator
Accessing the value of a variable through pointer
Pointer Arithmetic
Pointers as function arguments
Dynamic memory allocation
Structures
Explain
Define structure
Declaration, Initialization and Accessing of structure members
Structure assignment.
Array of structures
Self-referential structures with examples.
Define Union
Declaration, Initialization and Accessing of union members
Distinguish between Structures and Unions.

4. Introduction to Data Structures

Define Data Structure and classify them
Define internal Sorting
State the need of internal Sorting
List the methods of internal Sorting
Explain the Bubble Sort, Quick Sort and Merge Sort
Define searching
State the need of searching
List two types of searching
Explain the Linear Search, Binary Search
Explain the following for Singly Linked List and Doubly Linked List
Perform insertion, deletion and display operations

5. Stacks, Queues and Trees

Stacks

Define Stack
Explain the push, pop and display operations of a Stack
Explain Array implementation of a Stack with various operations.
List the applications of Stacks

Queues

Define Queue
Explain the insertion, deletion and display operations on Queues
Explain array implementation of a Queue with various operations.

Trees

Define a Tree
Explain the terminology related to Tree
Define Binary Tree
Explain the linear representation and linked list representation of a Binary Tree
Define Binary Search Tree
Perform insertion, deletion, search and various traversal operations on a Binary Search Tree.
List the Applications of trees

COURSE CONTENT

1. **Introduction to C Language, I/O Statements and Operators in C**: Structure of C language – steps involved in executing the C program- Character set - C Tokens - Keywords and Identifiers- Constants and Variables -Data Types and classification - declaration of constants and variables-initializing values to variables – reading and writing a singlecharacterfunctions-formattedinputandoutputstatements-operators-classificationofoperators-operatorprecedenceandassociativity -expressions - type conversion techniques.

2. **Understand Decision making statements, iterative statements, Arrays and Strings:** simple if, if-else, nested if-else – else if ladder- switch statement - Classification of various loop statements- while statement – do.. whilestatement-forloopstatement-nestingofloops-Comparisonsofdifferentloopstatements-gotostatement-breakandcontinuestatements-Arrays-OneDimensionalArrays -array programs-two Dimensional Arrays-programs on matrix -Strings - String handling functions

3. **Functions, Pointers, Structures and Unions:** Function – user defined functions – Advantages - Recursion concept -parameter passing -Local and External variables-Pointer- Pointer Arithmetic - Pointers as Function Arguments -Dynamic memory Allocation - Structures- Array of structures - Self referential structures – Union - difference between Structures and Union

4. **Data Structures:** Data structures – Internal Sorting – Bubble, Quick, Merge - Searching – Linear, Binary - Single Linked list - Insertion, Deletion and display operations - Double Linked List - Insertion, Deletion and display operations

5. **Stacks, Queues and Trees:** Stack – definition - Insertion, Deletion and display operations Queues - definition - Insertion, Deletion and display operations – Trees – Definition- Terminology – Binary Tree – Linear and Linked representation – Binary Search Tree - insertion, deletion, search and

various traversal operations - Applications

REFERENCE BOOKS

1 Programming in ANSI C E.Balaguruswamy Tata McGrawHill
2 Programming with C Gottfried TataMcGrawHill
3 C The complete Reference Schildt TataMcGrawHill
4 Data structures through C - Yashwanth Kanetkar
5 An Introduction to data structures with applications - Tremblay & Sorenson

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

Unit Test	Learning outcomes to be covered
Unittest-1	From1.1to2.8
Unittest-2	From 2.9to 3.5
Unittest-3	From4.1to5.7

ENGINEERING DRAWING

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

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Easy Type Questions	CO's Mapped
1	Use of Drawing Instruments, Free Hand Lettering and Dimensioning Practice	10	10	2	0	CO1
2	Principles of Geometric Constructions	15	15	1	1	CO2
3	Projections of points, lines, planes and solids	20	25	1	2	CO3
4	Sectional Views	20	10	0	1	CO4
5	Orthographic projection	25	20	0	2	CO5
	Total	**90**	80	4	6	

Course Objectives and Course Outcomes

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

Course Outcomes	**CO1**	AIM-107.1	Practice the use of engineering drawing instruments and Familiarise with the conventions to be followed in engineering drawing as per BIS
	CO2	AIM-107.2	Construct the i) basic geometrical constructions ii) engineering curves
	CO3	AIM-107.3	Visualise and draw the projections of i) Points ii) Lines iii) Regular Planes iv) Regular Solids
	CO4	AIM-107.4	Visualise and draw the sectional views of components
	CO5	AIM-107.5	Visualise and draw the orthographic projections of components

LEARNING OUTCOMES

Upon completion of the course the student shall able to

Use of Drawing Instruments, Free Hand Lettering and Dimensioning Practice

State the importance of drawing as an engineering communication medium

Select the correct instruments to draw the different lines / curves.

Use correct grade of pencil and other instruments to draw different types of lines and for different purposes

Identify the steps to be taken to keep the drawing clean and tidy.

Write titles using vertical and slopping (inclined) lettering and numerals of 7mm, 10mm and 14mm height.

Acquaint with the conventions, notations, rules and methods of dimensioning in engineering drawing as per the B.I.S.

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

Principles of Geometric Constructions

Practice the basic geometric constructions like i) dividing a line into equal parts

i) Exterior and interior tangents to the given two circles

ii) Tangent arcs to two given lines and arcs

Draw any regular polygon using general method when i) side length is given
i) Inscribing circle radius is given ii) describing circle radius is given
Draw the engineering curves like i) involute ii) cycloid

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

Explain the basic principles of the orthographic projections
Visualise and draw the projection of a point with respect to reference planes (HP & VP)
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)
Visualise and draw the projections of planes (up to planes perpendicular to one plane and inclined to other plane)
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)

Sectional Views

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

Orthographic projection

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

Competencies and Key competencies to be achieved by the student

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

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

COURSE CONTENTS:

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

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

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

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

Importance of lettering – Types of lettering -Guide Lines for Lettering Practicing of letters & numbers of given sizes (7mm, 10mm and 14mm)-Advantages of single stroke or simple style of lettering - Use of lettering stencils- Purpose of engineering Drawing, Need of B.I.S code in dimensioning -Shape description of an Engineering object -Definition of Dimensioning size description -Location of features, surface finish, fully dimensioned Drawing -Notations or tools of dimensioning, dimension line extension line, leader line, arrows, symbols, number and notes, rules to be observed in the use of above tools -Placing dimensions: Aligned system and unidirectional system (SP-46-1988)- Arrangement of dimensions Chain, parallel, combined progressive, and dimensioning by co-ordinate methods-The rules for dimensioning standard, features “Circles (holes) arcs, angles, tapers, chamfers, and dimension of narrow spaces.

2.0 Geometric Constructions

Division of a straight line into given number of equal parts –Drawing interior and exterior tangents to two circles of given radii and centre distance-Drawing tangent arc of given radius to touch two lines inclined at given angle (acute, right and obtuse angles), Tangent arc of given radius touching a circle or an arc and a given line, Tangent arcs of radius R, touching two given circles internally and externally-Construction of any regular polygon by general method for given side length, inscribing circle radius and describing/superscripting circle radius - Involute, Cycloid, explanations as locus of a moving point, their engineering application, viz., Gear tooth profile, screw threads, springs etc. – their construction

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

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

Projections of points -Projections of straight line –(a) Parallel to both the planes, (b)Perpendicular to one of the planes and (c) Inclined to one plane and parallel to other planes-Projections of regular planes-(a) Plane parallel to one of the reference planes, (b) Plane perpendicular to HP and inclined to VP and vice versa- Projections of regular solids- (a) Axis perpendicular to one of the planes, (b) Axis parallel to VP and inclined to HP and vice versa.

4.0 Sectional Views

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

Orthographic Projections

Meaning of orthographic projection - Using a viewing box and a model – Number of views obtained on the six faces of the box, - Legible sketches of only 3 views for describing object -Concept of front view, top view, and side view sketching these views for a number of engineering objects - Explanation of first angle projection. – Positioning of three views in First angle projection -Projectionof points as a means of locating the corners of the surfaces of an object – Use of meter line in drawing a third view when other two views are given -Method of representing hidden lines -Selection of minimum number of views to describe an object fully.

REFERENCE BOOKS

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

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

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

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

COURSE OBJECTIVES	**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 defied identifiers and usage of writing statements in C-Program. 3. Evaluate all the expressions using different primary types of data, derived data, operators and with their precedence, 4. Write C-programs using I/O statements, decision making statements. 5. Write structured and modular C-programs 6. Write C-programs to implement dynamic memory allocation using pointer concepts 7. To know the various types of Data Structures 8. To familiarize with the representation of Data Structures

Course Outcomes		Upon completion of the course the student shall be able to
CO1	AIM108.1	Perform Edit, compile and debug and execution of C-Programs
CO2	AIM108.2	Develop programs using different predefined functions, keywords, user defined identifiers
CO3	AIM108.3	Write different expressions using available C-operators and valid data supported by C-language
CO4	AIM108.4	Develop C-programs using control statements, arrays, structures, unions
CO5	AIM108.5	Develop C-programs using user defined functions and recursion
CO6	AIM108.6	Develop C-programs to implement dynamic memory and Data Structures concept

LEARNINGOUTCOMES:

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**
6. **Exercise on input and output of characters**
7. Exercise on formatted input and output
8. Exercise on escape sequence characters

Control statements

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

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

Arrays, Functions and Pointers

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

Structures, unions, Sorting and Searching

24. Exercise on structure
25. **Exercise on union**
26. Exercise on array of structures
27. Bubble Sort
28. Quick Sort
29. Merge Sort
30. Linear Search

31. Binary Search

Linear and Non Linear Data Structures

32. Single Linked list operations
33. Double Linked list operations
34. Stack using Arrays.
35. Queues using Arrays.
36. Binary Tree Traversals using Recursion

The competencies and key competencies to be achieved by the student

S. No.	Name of the experiment	Objectives	Key Competencies
1	Exercise on structure of C program	For a given C program, identify the different Building blocks	❖ Identify different building block in a C program
2	Exercise on Keywords and identifiers	For a given C program identify the keywords and identifiers	❖ Identify different keywords ❖ Check whether the keywords are in lowercase ❖ Differentiate identifiers and keywords
3	Exercise on constants and variables	For a given C program identify the constants and variables	❖ Identify the constants ❖ Identify the variables ❖ Declare variables with proper names ❖ Know the assignment of values t
4	Execution of simple C program	Execute a simple C program	❖ Acquaint with C program editing ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program
5	Exercise on operators	Write a C program that uses different arithmetic operators	❖ Identify different arithmetic operators ❖ Identify the priorities of operators ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program ❖ Check the output for its correctness
6	Exercise on input and output of characters	Write a C program for reading and writing characters	❖ Know the use of getchar() function ❖ Know the use of putchar() function ❖ Compile the program ❖ Rectify the syntactical errors ❖ Execute the program ❖ Check whether the correct output is printed for the given input

7	Exercise on formatted input and output	Write a C program using formatted input and formatted output	❖ Know the use of format string for different types of data in scanf() function ❖ Know the use of format string for different types of data in printf() function ❖ Check whether the data is read in correct format ❖ Check whether the data is printed in correct format
8	Exercise on Escape Sequence Characters	Write a C program using Escape Sequence Characters	❖ Know the use of Escape sequence characters ❖ Use the Escape sequence characters ❖ Check whether the data is read in correct format ❖ Rectify the syntax errors ❖ Check the output for correctness
9	Exercise on simple if statement	Write a C program using simple if statement	❖ Build a relational expression ❖ Use the if statement for decision making ❖ Rectify the syntax errors ❖ Check the output for correctness
10	Exercise on if..else statement	Write a C program using if..else statement	❖ Build a relational expression ❖ Use the if..else statement for decision making ❖ Rectify the syntax errors ❖ Check the output for correctness
11	Exercise on else..if ladder statement	Write a C program using else..if ladder statement	❖ Use else..if ladder statements with correct syntax ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check the output for correctness
12	Exercise on switch statement	Write a C program using switch statement	❖ Use switch statement with correct syntax ❖ Identify the differences between switch and else..if ladder ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check the output for correctness
13	Exercise on conditional operator	Write a C program using (**?** **:**) conditional operator	❖ Build the three expressions for conditional operator ❖ Use conditional operator with correct syntax ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Differentiate conditional operator and if..else statement

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

			❖ Classify functions based on it parameters and return types ❖ Identify parameters passed ❖ Identify parameter passing method used ❖ Identify return value ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
21	Exercise on parameter passing techniques	Write a C program using parameter passing techniques	❖ Know the use of parameter passing ❖ Use the different parameter passing techniques ❖ Check whether the parameters passed correctly or not. ❖ Rectify the syntax errors ❖ Check the output for correctness
22	Exercise on recursion	Write a C program using recursion	❖ Identify where recursive call is made in the function ❖ Validate the termination condition ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
23	Exercise on pointers	Write a C program using pointer data type	❖ Declare pointer variable ❖ Initialize pointer variable ❖ Access a variable through its pointer ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
24	Exercise on structure	Write a C program using structure	❖ Define a structure with correct syntax ❖ Identify different members of a structure ❖ Declare a structure variable ❖ Access different members of structure ❖ Observe the size of the structure ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input

25	Exercise on union	Write a C program using union	❖ Define a union with correct syntax ❖ Identify different members of a union ❖ Declare a union variable ❖ Access different members of union ❖ Observe the size of the union ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
26	Exercise on array of structures	Write a C program to create an array of structures and store and retrieve data from that array	❖ Define a structure with correct syntax ❖ Identify different members of a structure ❖ Declare a structure variable ❖ Create an array of structure ❖ Access individual element of the array of structure ❖ Access different members of structure ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
27	Bubble Sort	Write a C program to implement bubble sort technique	❖ Read an array with unsorted order of elements without duplicates ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
28	Quick Sort	Write a C program to implement Quick sort technique	❖ Read an array with unsorted order of elements without duplicates ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
29	Merge Sort	Write a C program to implement Merge sort technique	❖ Read 2 arrays with unsorted order of elements without duplicates ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
30	Linear Search	Write a C program to implement Linear Search	❖ Read elements into an array in a random way without duplication to search a particular element ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input

31	Binary Search	Write a C program to implement Binary Search	❖ Read elements into an array in a sorted sequence without duplication to search a particular element ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
32	Single Lined List Operations	Write a C program to implement Single Linked List Operations.	❖ Create sequence of nodes to form a single linked list ❖ Perform different insertions and deletions from the linked list ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
33	Double Linked list operations	Write a C program to implement Double Linked List Operations.	❖ Create sequence of nodes to form a double linked list ❖ Perform different insertions and deletions from the linked list ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
34	Stack using Arrays	Write a C program to implement stack using Arrays.	❖ Perform push, pop and display operations ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
35	Queues using Arrays	Write a C program to implement queue using Arrays	❖ Perform insert, delete and display operations ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input
36	Binary Tree Traversals using Recursion	Write a C program to implement Binary tree traversals using Recursion	❖ Create a Binary tree ❖ Perform in-order, pre-order and post-order traversals ❖ Rectify the syntax errors ❖ Debug logical errors ❖ Check for the correctness of output for the given input

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

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

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

CO-PO MAPPING

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

Competencies and Key competencies to be achieved by the student

Name of the Experiment (No of Periods)	Competencies	Key competencies
1. Hands on practice on Vernier Calipers(03)	• 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 place 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. 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
6 Refractive index of solid using traveling microscope(03)	• Find the least count of vernier on microscope • Place the graph paper below microscope • Read the scale • Calculate the refractive index of glass slab	• Read the scale • Calculate the refractive index of glass slab

7 . Boyle"s law verification (03)	• Note the atmospheric pressure • Fix the quill tube to retort stand • Find the length of air column • Find the pressure of enclosed air • Find and compare the calculated value P x l	• Find the length of air column • Find the pressure of enclosed air • Find the value P x l
8. 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
9. Velocity of sound in air -Resonance method (03)	• Arrange the resonance apparatus • Adjust the reservoir level for booming sound • Find the first and second resonanting lengths • Calculate velocity of sound	• Adjust the reservoir level • Find the first and second resonanting lengths • Calculate velocity of sound at room temperature Calculate velocity of sound at 0^0 C
10 Meter bridge(03)	• Make the circuit connections • Find the balancing length • Calculate unknown resistance • Find the radius of wire • Calculate the specific resistance	• Find the balancing length • Calculate unknown resistance Calculate the specific resistance

Scheme of Valuation for END Practical Examination:

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

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

Subject Title :**Chemistry Laboratory**
Subject Code :**Common -110**
Periods per week **03**
Total periods per year **45**

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

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

TIMESCHEDULE

S.No	Name of the Experiment	No. of Periods	Mapped with COs
1.	ognition of chemical substances and solutions used in the laboratory by senses. b) Familiarization of methods for Volumetric analysis	03	CO1
2.	ion of StdNa_2CO_3 and making solutions of different dilution solution.	03	CO1
3.	Estimation of HCl solution using Std.Na_2CO_3 solution	03	CO2
4.	Estimation of NaOH using Std.HCl solution	03	CO2
5	ination of acidity of water sample	03	CO2
6	ination of alkalinity of water sample	03	CO2
7.	ion of Mohr‟s Salt usingStd.$KMnO_4$	03	CO3
8.	tion of Ferrous ion by using Std. $K_2Cr_2O_7$	03	CO3
9.	ination of total hardness of water using Std. EDTA solution	03	CO4
10.	tion of Chlorides present in water sample	03	CO4
11.	tion of Dissolved Oxygen (D.O) in water sample	03	CO5
12.	Determination of pH using pH meter	03	CO5
13	Determination of conductivity of water and adjusting ionic strength	03	CO5
14.	Determination of turbidity of water	03	CO5

15.	Estimation of total solids present in water sample	03	CO5
	Total:	**45**	

Objectives:

Upon completion of the course the student shall be able to

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

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

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

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

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

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

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

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

9.0 Conduct titrations adopting standard procedures to determine the total hardness of given samples of water (One ground water and one surface / tap water) using Std. EDTA solution

10.0 Conduct titrations adopting standard procedures to determine the chlorides present inthe 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

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
rization of methods for Volumetric analysis. Recognition of chemical substances And solutions	-	--
ation of StdNa_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 pipetteand 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
Estimation of HClsolution using Std. Na_2CO_3solution (03)	▪ Cleaning the glassware and rinsing with appropriate solutions ▪ Making standard solutions ▪ Measuring accurately the standard solutions and titrants ▪ Filling the burette with titrant ▪ Fixing the burette to the stand ▪ Effectively Controlling the flow of the titrant ▪ Identifying the end point ▪ Making accurate observations ▪ Calculating the results	▪ Making standard solutions ▪ Measuring accurately the standard solutions and titrants ▪ Effectively Controlling the flow of the titrant ▪ Identifying the end point ▪ Making accurate observations
Estimation of NaOH using Std.HCl solution (03)		
Determination of acidity of water sample (03)		
ination of alkalinity of water sample (03)		
tion of Mohr‟s Salt usingStd.$KMnO_4$ (03)		
tion of Ferrous ion by using Std.$K_2Cr_2O_7$ (03)		
mination of total hardness of water using Std. EDTA solution (03)		
ation of Chlorides present in water sample (03)		
ation of Dissolved Oxygen(D.O) in water sample (By titration method) (03)		
Determination of pH using pH meter (03)	▪ Familiarize with instrument ▪ Choose appropriate „Mode‟ / „Unit‟ ▪ Prepare standard solutions / buffers, etc. ▪ Standardize the instrument with appropriate standard solutions ▪ Plot the standard curve	▪ Prepare standard solutions / buffers, etc. ▪ Standardize the instrument with appropriate standard solutions ▪ Plot the standard curve ▪ Make measurements accurately
Determination of conductivity of water and adjusting ionic strength to required level (03)		

Determination of turbidity of water (03)	▪ Make measurements accurately ▪ Follow Safety precautions	
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

SCHEME OF VALUATION

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

B) Demonstrated competencies 20M

Making standard solutions
Measuring accurately the standard solutions and titrants
Effectively controlling the flow of the titrant
Identifying the end point
Making accurate observations

C) Viva-voce 5M

Total 30M

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

Time schedule:

Chapter No.	Chapter/Unit Title	No. of sessions each of 4 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**

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

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

Course Outcomes	At the end of the course students will be able to		
	CO1	AIM-111.1	Identify hardware and software components
	CO2	AIM-111.2	Prepare documents with given specifications using word processing software
	CO3	AIM-111.3	Use Spread sheet software to make calculation and to draw various graphs / charts.
	CO4	AIM-111.4	Use Power point software to develop effective presentation for a given theme or topic.
	CO5	AIM-111.5	Edit digital or scanned images using Photoshop

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) ResetButton b. Identify and connect variousperipherals c. Identify and connect the cables used with computersystem d. Identify various ports on CPUand connect Keyboard & Mouse	Connect cables to external hardware andoperate the computer
(b).	To Start and Shut downComputer correctly	a. Log in using the password b. Start and shut down thecomputer c. Use Mouse and Key Board	a. Login and logout asper the standard procedure b. Operate mouse &Key Board
(c).	To Explore WindowsDesktop	a. Familiarize with Start Menu, Taskbar, Icons and Shortcuts b. Access application programsusing Start menu, Task manager c. Use Help support	a. Access application programs using Start menu b. Use taskbar andTask manager
2.	To check the software details of the computer	a. Find the details of OperatingSystem being used b. Find the details of ServicePack installed	Access the properties of computer and findthe details
3.	To check the hardware present in your computer	a. Find the CPU name and clock speed	a. Access device manager and find

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

		features in MS- word f. Use Undo and Redo Features g. Use spell check to correct Spellings and Grammar	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	Enter Mathematical symbols and

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

			conditional calculations
19.	To sort and filter data in table	a. Sort data in multiple columns b. Sort data in a row 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	a. Insert Sounds and Video in appropriate format. b. Add narration to the slide

		slide d. Use automatic and on click options e. Add narration to the slide f. Insert Hyperlinks	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 d. Set up resolution e. Exercise with Rehearse Timings feature in PowerPoint f. Use PowerPoint Pen Tool during slide show g. Saving h. Printing presentation (a) Slides (b) Hand-out	a. Use Spell check and Grammar feature b. Setup slide show c. Add timing to the slides d. Setup automatic slide show
33	To familiarize with standard toolbox	a. Open Adobe Photoshop b. Use various tools such as i. The Layer Tool ii. The Color& Swatches Tool iii. Custom Fonts & The Text Tool iv. Brush Tool v. The Select Tool vi. The Move Tool vii. The Zoom Tool viii. The Eraser ix. The Crop Tool x. The Fill Tool	Open a photograph and save it in Photoshop
34	To edit a photograph	a. Use the Crop tool b. Trim edges c. Change the shape and size of a photo d. Remove the part of photograph including graphics and text	to edit image by using corresponding tools.
35	To insert Borders around photograph	a. Start with a single background layer	create a border or frame around an

		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	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. e. In the Layers panel, drag the background layer below the foreground image layer.	swap background elements using the Select and Mask tool and layers.
37	To change colors of Photograph	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-2023 (III Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Semester	Scheme Of Examinations			
		Theory	Practicals		Duration (hrs)	Sessional Marks	End Exam Marks	Total Marks
THEORY SUBJECTS								
AIM-301	Mathematics –II	4		60	3	20	80	100
AIM-302	Java Programming	4	-	60	3	20	80	100
AIM-303	Operating systems	4	-	60	3	20	80	100
AIM-304	Digital Electronics & Computer Organization	5	-	75	3	20	80	100
AIM-305	DBMS	5	-	75	3	20	80	100
PRACTICAL SUBJECTS								
AIM-306	Java Programming Lab	-	6	90	3	40	60	100
AIM-307	Computer Networking & Cyber Security Lab	-	3	45	3	40	60	100
AIM-308	DBMS Lab	-	4	60	3	40	60	100
AIM-309	Android Programming Lab		4	60	3	40	60	100
	ACTIVITIES		3	45				
	Total	22	20	630		260	640	900

AIM-301,303,305,308 Common with CM Branch.
AIM-302,306 Common with CM-404, 407 Branch respectively.
AIM-307 Common with CM-409
AIM-309 Common with CM-506

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

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

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

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

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

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

Unit-I
Integral Calculus

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

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

State the indefinite integral of standard functions and properties of $\int (u+v)\,dx \quad \int k\,u\,dx$

andwhere *u, v* are functions of *x* and *k* is constant.

Solve problems involving standard functions using these properties.

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

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

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

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

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

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

Evaluate the Standard integrals of the functions of the type

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

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

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

Evaluate integrals using decomposition method.

Solve problems using integration by parts.

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

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

State the fundamental theorem of integral calculus

Explain the concept of definite integral.

Solve simple problems on definite integrals.

State various properties of definite integrals.

Evaluate simple problems on definite integrals using these properties.

Unit -II

Differential Equations

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

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

Find order and degree of a given differential equation.

Form a differential equation by eliminating arbitrary constants.

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

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

Syllabus for Unit test-I completed

Unit-III

Graph Theory and Probability

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

L.O. 3.1 Define a graph.

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

State the significance of Graph Theory in Computer Science applications.

Explain incidence and degree of a graph.

Explain the relation between degree and edges of a graph.

Explain various types of graphs, null graph, trivial graph, simple graph, multigraph, directed

graph, non-directed graph and cyclic graph.

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

Explain the formation of adjacency matrix of a graph.

Recall the basic probability principles.

Define permutations and combinations with examples.

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

Solve simple problems on addition theorem.

Explain conditional event and conditional probability.

Solve simple problems on conditional probability.

Explain dependent, independent events and state multiplication theorem.

Solve simple problems on multiplication theorem.

Explain the concept of priori and posteriori probabilities.

State Bayes' theorem and solve simple problems.

Unit-IV

Statistics

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

L.O. 4.1 Recall the measures of central tendency.

Explain the significance of measures of dispersion to determine the degree of heterogeneity ofthe data.

Find the measures of dispersion, Range, Mean Deviation and Standard Deviation for ungrouped data.

Explain the merits and demerits of these measures of dispersion

Explain bivariate data.

Explain the concept of covariance and correlation between two variables.

Calculate Pearson's correlation coefficient between two variables.

Find Spearman's rank correlation coefficient.

Explain predictor variables, outcome variables and simple linear regression.

Calculate the regression coefficients and regression equations with simple problems.

Syllabus for Unit test-II completed

C-23 AIM - 301

Engineering Mathematics – II

(Common to CM/AIML/AMG/AMT/CAI/CCB/CCN/WD)

CO/PO – Mapping

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

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

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

For PO5: Appropriate quiz programmes may be conducted at intervals and duration as decided by concerned faculty.

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

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

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

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

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

COURSE CONTENTS

Unit-I

Indefinite Integration:

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

Evaluation of integrals which are of the following forms:

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

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

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

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

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

Unit -II

Differential Equations:

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

Unit-III

Graph Theory and Probability

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

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

Unit III

Statistics

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

Textbook:

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

Reference Books:

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

Engineering Mathematics – II

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

TIME SCHEDULE

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

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

Unit Test Syllabus

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

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

Time Schedule

Chapter No.	**Chapter/Unit Title**	**No. of Periods**	**Marks**	**No. of Short Answer Questions**	**No. of Essay Type Questions**	**CO's Mapped**
1.	Object oriented programming concepts and Basics of java, Overloading	10	13	1	1	CO1,CO2
2.	Concepts of inheritance, overriding, Interfaces and Packages	12	26	2	2	CO2
3.	I/O Streams and Collections.	12	21	2	1.5	CO3
4.	Exception handling and Multi threaded programming.	12	21	2	1.5	CO4
5.	Applets, AWT and Event Handling	14	29	3	2	CO4,CO5
	Total	**60**	110	10	8	

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

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

Learning Outcomes:

Object oriented programming concepts and Basics of java and overloading

Know about object-oriented programming
Compare procedure-oriented programming and object-oriented programming
List and explain features of object-oriented programming
Importance of Java in Internet programming.
Explain features of Java. Define Byte codes of Java, JVM.
How to write and executing a Java program. List different keywords andcomment statements in Java.
Explain data types ,scope and life time of variables.
Describe conversion and casting features.
Apply one-dimensional and two–dimensional arrays give exampleprograms.
Illustrates usage of conditional and iteration statements of Java with anexample programs.
Describe usage of jump statements, break, and continue statements.
Describe how to create classes and objects.
Demonstrate Usage of new operator and methods.
Explain usage of constructors with an example programs.
Apply method overloading and construction overloading in applications.
Describe usage of 'this' pointer with example.
Explain usage of static in variables, methods, and blocks.
Explain about string classes.
Usage of command-line arguments.

Concepts of inheritance, overriding, Interfaces and Packages

Explain implementation of inheritance with an example program.
Illustrate how to implement multilevel inheritance with an example program.
Explain method overriding and usage of super keyword.
Describe concept of Interfaces.
Define an Interface.
Differences between abstract classes and interface.
Explain how to implement interfaces with sample program.
Define a package.
Explain the concept of class path.
Describe concept of Access protection.
Illustrate the mechanism of importing packages.
Give simple application to design packages with sample programs.

I/O Streams and Collections.

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

List
Set
Queue
Deque

List Collection classes and explain the following with examples

ArrayList
LinkedList
HashSet

Iterator
How to access a Collection via an Iterator?

Exception handling and Multi threaded programming.

Describe sources of errors.
Give advantages of Exception handling.

Types of exceptions

- Checked
- Unchecked

Apply following key words to handling exceptions through sample programs

- Try
- Catch
- Finally
- Throw
- Throws

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

Applets, AWT, Event Handling.

Describe the basics of Applets – Life cycle of an applet.
Describe steps for design and execute sample applet program
Explain Graphics class methods
Update(), Paint(), Drawing Lines, Rectangle, circles, polygons
Working with Color Font classes.
Describe AWT classes
Explain how to design Frame window with example.
Describe Types of Events
List and explain sources of events. 5.9List
and explain different event classes. 5.10List
and explain event listener interfaces
Demonstrate event handling mechanism.
Demonstrate handling mouse events with sample program.
Demonstrate handling keyboard events with sample program.
5.14Explain how to use AWT controls in applet programming.

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

COURSE CONTENTS

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

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

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

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

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

REFERENCE BOOKS

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

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

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.6
Unit test-2	From 3.7 to 5.14

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

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Introduction to Operating system	12	16	2	1	CO1
2.	Process management	12	16	2	1	CO2, CO6
3.	Synchronization & Deadlocks	12	26	2	2	CO3, CO6
4.	Memory management	12	26	2	2	CO4, CO6
5.	Disk scheduling and File management	12	26	2	2	CO5, CO6
	Total	**60**	110	10	8	

Course Objectives	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	CO1	AIM-303.1	Explain basic concepts of Operating System
	CO2	AIM-303.2	Explain process scheduling algorithm

comes	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

Learning Outcomes:

Introduction to operating systems

Define an operating system

Discuss history of operating system

Discuss about various types of operating systems

Distinguish spooling and buffering

Explain the concepts multiprogramming and timesharing

Differentiate between distributed and real time systems

Describe multiprocessor systems

Describe the operating system components

Discuss operating system services

Define system call with an example

List and explain different types of system calls

Define single user, multi user operating system structure

Process management

Define process and process control block

Explain process state diagram

Describe process creation and termination

Discuss the relation between processes

Define Thread and describe multithreading

Explain scheduling concepts

Describe scheduling queues and schedulers

Explain CPU scheduling and scheduling criteria

Explain various scheduling algorithms

FCFS

SJF

Round Robin

Priority

Multilevel Scheduling

Synchronization & Deadlocks

Describe semaphores

Explain inter process communication

Define Deadlock

State the necessary conditions for arising deadlocks

State various techniques for deadlock prevention

Discuss Deadlock avoidance and detection

Describe the process of recovering from deadlock

Memory management

Describe briefly address binding, dynamic loading, dynamic linking

Define overlays

Describe briefly on swapping

Explain single partition allocation

Explain multiple partition allocation

Explain the concept of fragmentation

Explain paging concept

Explain how logical address is translated into physical address

Explain segmentation and segmentation with paging

Define virtual memory techniques

Describe demand paging

Describe page replacement

Discuss on page replacement algorithms

FIFO

LRU

Optimal

Explain the concept of thrashing

Explain working set model and page fault frequency

Disk scheduling and File management

List out various disk performance parameters

Disk scheduling policies

FIFO

SSTF

SCAN

Define file management

List and explain various file operations

List and explain various access methods

List and explain various allocation methods

List and explain directory structure

Explain disk organization and structure

COURSE CONTENT

1.0 Introduction to operating systems

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

2. Process management

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

3. Synchronization & Deadlocks

Inter Process Communications - semaphores – monitors

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

4. Memory management

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

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

5. Disk scheduling and File management

Disk performance parameters - Disk scheduling policies –

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

REFERENCE BOOKS

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

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

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.2
Unit test-2	From 3.3 to 5.7

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

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Number systems, Logic Gates ,Bo Algebra and basic Combinational	15	16	2	1	CO1,CO3
2.	Flip-Flops &Counters	15	16	2	1	CO1,CO2
3.	Information representation & CPU Organization	15	26	2	2	CO1,CO2, CO3
4.	Memory Organization	15	26	2	2	CO2,CO4
5.	I/O Organization	15	26	2	2	CO3,CO4, CO5
	Total	**75**	110	10	8	

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

	At the end of the course the student able to learn following:		
	CO1	AIM-304.1	Describe fundamental Numbering concepts and techniques used in digital electronics, the switching algebra theorems and logic gates

Course Outcomes	CO2	AIM-304.2	Analyse the operation of flip flops and counting circuits
	CO3	AIM-304.3	Explain the Basic computer organization techniques and information representation
	CO4	AIM-304.4	Explain Memory organization
	CO5	AIM-304.5	Describe Handling of I/O organization

Learning Outcomes:

Circuits

Number systems
List the various number systems used in digital Computer.
Explain Decimal , Binary, octal, Hexa Decimal number systems
Convert decimal number to other base conversion.
Decimal to Binary
Decimal to Octal
Decimal to Hexadecimal
Convert binary number to other base conversion.
Binary to Decimal
Binary to octal
Binary to Hexadecimal
Convert octal number to other base conversion.
Octal to Decimal
Octal to Binary
Octal to Hexadecimal
Convert hexadecimal other base conversion.
Hexadecimal to Decimal
Hexadecimal to Binary
Hexadecimal to Octal
Binary numbers representation.
Define Binary numbers representation.
List the types of Binary numbers representation.
Explain Unsigned binary number representation.
Explain Signed binary number representation.
Binary coded decimal (BCD) coding scheme.
Define Binary coded decimal (BCD) coding scheme.
List the types of Binary coded decimal (BCD)
Draw and explain 8421 code.
Draw and explain 2421 code.
Draw and explain 8 4-2-1 code.

Boolean algebra

Explain AND, OR, NOT operations with truth tables.
Explain the working of EX-OR and EX-NOR operations with truth tables.
List the different postulates in Boolean algebra.
State De-Morgan,,s theorems.
Prove De-Morgan,,s theorems using truth tables.

Apply De-Morgan,,s theorems and other postulates of Boolean algebra to simplifythe given Boolean expression.
Write Boolean expression for given truth table.
Using Sum-Of-Products(SOP) method
Using Product-Of-Sums(POS)method
Use K – map to simplify Boolean expression (up to 4 variables).
Using Two variable K-Map
Using Three variable K-Map
Using Four variable K-Map

Logic Gates

Define Logic gate
List basic gates
Define OR gate
Explain OR gate with logic symbol and truth table.
Define AND gate
Explain AND gate with logic symbol and truth table.
Define NOT gate
Explain NOT gate with logic symbol and truth table.
What is universal gate? List universal gates
Define NOR gate
Explain NOR gate with logic symbol and truth table.
Define NAND gate
Explain NAND gate with logic symbol and truth table.
Define EX-OR and EX-NOR gates
Explain the working of EX-OR and EX-NOR gates with truth tables.
Implement AND, OR, NOT, EX-OR gates using NAND gates only
Implement AND, OR, NOT, EX-OR gates using NOR gate only.

Basic Combinational Circuits
Define the Half Adder. Explain the function of Half Adder.
Draw Half-Adder circuit using an exclusive OR and an AND gate.
Draw a Half–Adder using only NAND gates or only NOR gates.
Define the Full Adder. Explain the function of Full Adder.
Construct Full Adder using two Half-Adder and an OR gate

Flip-Flops, Counters

FLIP-FLOPS

List the details of different logic families**.**
Define positive and negative logic levels.
Define Flip flop
Draw and explain the basic principle of operation of a Flip-flop.
Define Latch.
Explain the working of a NAND latch circuit with truth table and Timing diagram
Explain the working of a NOR latch circuit with truth table and Timing diagram
Differentiate between Latch and Flip-flop.
Explain with block diagram, waveforms and truth tables the working of RS Flip-flop.
Explain with block diagram, waveforms and truth tables the working of RST Flip-flop.
Explain with block diagram, waveforms and truth tables the working of D Flip-flop.
Explain with block diagram, waveforms and truth tables the working of JK Flip-flop.

Explain with block diagram, waveforms and truth tables the working of T Flip-flop.
Draw and explain the need for a Master-Slave flip-flop.
Explain the working of a Master-Slave flip-flop using suitable circuit diagram andtruth table.

Counters

Define Counter
List the types of counters.
Define Synchronous counter
Define Asynchronous counter
Distinguish between asynchronous and synchronous counters.
Draw and explain module-10 (decade) Asynchronous counter circuit diagramwith waveforms and truth tables
Draw and explain module-8 synchronous counter circuit diagram with waveforms and truth tables
Draw and explain module-16 synchronous counter circuit diagram withwaveforms and truth tables
List the advantages of synchronous counters
Programmable counter
Draw and explain the need for a Programmable counter 2.2.10.2Explain how to design Programmable counter circuit diagram
List the applications of counter.

CPU Organization & Information representation and Arithmetic Operation

CPU Organization

Draw the functional block diagram of Digital computer and explain the functionof each unit.
Define Register
State the purpose of
Accumulator
Program counter
Instruction Register
Memory Buffer Register
Memory Address Register
Draw the block diagram of simple accumulator based CPU.
Explain the function of each unit
Define the terms micro operation, macro operation,
Define instruction cycle, fetch cycle and execution cycle.
What is stored program concept
Describe the sequential execution of a program stored in memory by the CPU

Information representation and Arithmetic Operation

Explain the basic types of information representation in a computer.
Define floating point representation and fixed point representation ofnumbers.
Illustrate the floating point and fixed point representations with example.
Distinguish between Fixed point and Floating point representations.
What is Instruction format
Define Opcode , Operand and address.
Explain different types of instructions with examples
Zero address instructions

One address instructions
Two address instructions
Three address instructions
List and explain various addressing modes.

Memory Organization

Distinguish between main and auxiliary memory.
State the need for memory hierarchy in a computer.
Explain memory hierarchy in a computer in detail
State the significance of various memory device characteristics: access time, access rate, alterability, permanence of storage, cycle time.
Discuss Associative Memory
Explain the principle of virtual memory organization in a computer system
Explain virtual address and physical address organization.
State the principle of locality of reference
Explain Cache memory organization.
Analyze the importance of the principle of memory interleaving in a computer.

I/O Organization

List the any five peripheral devices that can be connected to a computer.
Define Interface.
Explain the need for an interface.
List modes of date transfer.
Explain synchronous and asynchronous data transfer.
Compare synchronous and asynchronous data transfer.
Explain hand shaking procedure of data transfer.
Explain programmed I/O method of data transfer.
Explain interrupted initiated I/O.
Explain DMA controlled transfer.
Explain priority interrupt, polling, and daisy chaining priority.
Write about bus system
List the four bus systems.
Differentiate between i/o bus and memory bus

COURSE CONTENTS

1. **Number systems, Boolean algebra and Logical Gates :** List the various number systems used in digital Computer, Explain Decimal , Binary, octal, Hexa-Decimal number systems, Convert decimal number to other base conversion, Convert binary number to other base conversion, Convert octal number to other base conversion, Convert hexadecimal other base conversion, Binary numbers representation, Signed binary arithmetic, Binary coded decimal (BCD) coding scheme, Character representation, AND, OR, NAND, NOT, NOR & EX-OR gates. Logical definitions – Symbols – truth tables. Boolean theorems, Boolean simplifications of Boolean expressions, Using De-Morgan,,s theorems, Formation and implementation of Logic expressions, Karnaugh,,s mapping, Applications involving developing of combinational logic circuits. Half-Adder, Full-adder.

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

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

Information representation and Arithmetic Operation- Basic types of information representation - floating point representation and fixed point representation of numbers, Operand, Opcode and address - zero address, one address, two address and three address instructions - different addressing modes.

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

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

REFERENCE BOOKS

1. 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.

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

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

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Concepts of DBMS & RDBMS	18	29	3	2	CO1
2.	Concepts of SQL	22	26	2	2	CO2
3.	Basics of PL/ SQL	15	26	2	2	CO3
4.	Advance PL/SQL	10	16	2	1	CO4
5.	Concepts of NoSQL & MongoDB.	10	13	1	1	CO5
	Total	**75**	110	10	8	

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

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

		305.4	
	CO5	AIM-305.5	Use NOSQL database concepts and MongoDB data base concepts in designing database Schema.

Learning Outcomes:

Concepts of DBMS &RDBMS

Define Database Management System(DBMS)
List the advantages of DBMS
Explain Database Abstraction, Data Independence
Define Instances and Schemas
Explain Data Models.
Define Database languages DDL, DML, TCL
Explain Database Administrator, Users and Database System Architecture with diagram.
Define Entity, Entity sets, Relationship, Relationship sets, Super Key , Candidate Key and Primary Key, Foreign Key
Explain Mapping Cardinalities.
List the symbols used in ER model.
Know The Entity-Relationship Model.
Reduce the ER-diagrams to tables
Explain Generalization, Specialization &Aggregation.
Explain Functional Dependencies, Normalizations- 1 NF, 2 NF and 3NF

Concepts of SQL

Explain SQL and benefits of SQL.
Describe about Embedded SQL and Lexical conventions
Describe Naming of the Objects and parts and how to refer them.
Explain literals &different data types like character, number, long, date, raw and longraw etc.
Illustrate the comments within SQL Statement
Explain SQL Operators
Describe Data Definition Language commands CREATE, ALTER and DROP.
Explain integrity constraints through creating a table and altering table.
Describe Data Manipulation Language commands INSERT, UPDATE and DELETE
Explain SELECT statement with WHERE, ORDER BY, GROUP BY and HAVING clauses with examples
List and explain single row(Number, character, date and conversion) functions
List and Explain group functions
Explain Transaction Control Commands COMMIT, SAVEPOINT, ROLLBACK, GRANT, and REVOKE.
Explain Sub Queries with examples
Explain Joins (Equi Join, Non-Equi Joins, Inner Join, Outer Join, cross join and Self join) with syntax and examples.

PL/SQL

Explain PL/SQL Block structure.
List the features of PL/SQL
Explain the data types of PL/SQL
Declaration of variables
Explain PL/SQL tables and user defined records.
Explain Input/Output statements
Explain decision making statements and illustrate
Explain looping statements and illustrate
Define procedure and function
Describe the advantages of subprograms.
Explain handling procedures and functions with example programs.
Explain the parameter modes in PL/SQL (in , out and in out)

Advanced PL/SQL

Define cursor.
Classify cursors
Explain implicit cursor with example
Explain explicit cursors with example
Define trigger
List Advantages of triggers
Explain database triggers.

Concepts of NoSQL & MongoDB.

No SQL
List features of NOSQL
Compare RDBMS and NoSQL
List the Advantages and Disadvantages of NoSQL
Know about the ACID and BASE system.
Compare ACID and BASE properties
NoSQL
Key-value stores,
Column-oriented,
Graph oriented Databases
Document oriented Databases.

MongoDB
What is mongoDB.
List the advantages of MongoDB
Explain the Creation, Dropping, Creation of Collection
Dropping of Collection of Database in MongoDB
Explain the Datatypes of MongoDB.
Explain Inserting Document, Query Document, Update Document, DeletingDocument &Sorting Document.

COURSE CONTENT

1. Concepts of DBMS & RDBMS

Define DBMS –Purpose of DBMS - Data Abstraction – Data Models – Instances and Schemas – Data Independence – Data Definition Language - Data Manipulation Language – Database Administrator - Database Users – Database system Structure.

Entities – Relationships and Relationship sets – Mapping constraints – Entity – Relationship Diagram – Super key , Candidate key and Primary key - Reducing E- R Diagrams to tables – Generalization and Specialization – Aggregation – Functional Dependencies - Normal forms 1NF , 2 NF , 3 NF

2. Concepts of SQL

Benefits of SQL – Embedded SQL – Lexical conventions – Naming objects and parts – Referring objects and parts – Literals – Text –Integer – Number – Data types – Character data types – Number data type – Long data type –Raw and Long Raw data types –Pseudo columns – comments within SQL statements – comments on schema objects.

Operators – Unary and Binary operators – Precedence- Arithmetic operators – character operators – comparison operators – logical operators- set operators – other operators – DDL Commands – Integrity Constraints – DML Commands - functions – single row functions – numeric functions – character functions – date functions – conversion functions – other functions- Group functions. Transaction control commands-Sub queries - Joins.

3. Basics of PL/SQL

Main features – architecture – advantage of PL/SQL – fundamentals – character set – Lexical units – Data types – data type conversion – Declaration -scope and visibility – assignments – expressions and comparisons – PL/SQL tables – user defined records.

Conditional control- IF statement – sequential control- GOTO and NULL statements. SQL support – national language support – Remote Access

Advantages of subprograms – procedures – Functions RETURN statement – forward declarations – actual versus formal parameters – positional and named notation - parameter modes

4. Advanced PL/SQL

Cursors – Implicit cursor – Explicit cursor – Triggers – Advantages - creating trigger – raising trigger -

5. NoSQL & Basics of MongoDB

Classification of Databases : RDBMS, OLAP, NoSQL.-Introduction to NoSQL- need for NoSQL – Comparison of RDBMS and NoSQL- Advantages and Disadvantages of NoSQL - BASE system – ACID System – Comparison of ACID and BASE properties – Classification of NoSQL as Key-value stores, Column-oriented, Graph and Document oriented Databases

Introduction to MongoDB - advantages of MongoDB - applications of MongoDB - Installation of MongoDB - Creation of Database - Dropping of Database - Creation of Collection - Dropping of Collection - Data types of MongoDB - different Commands of MongoDB - Inserting Document - Query Document - Updating Document – Deleting Documents - Sorting Documents

REFERENCE BOOKS

1. Database System Concepts --- Silberschatz, Henry F. Korth, S. Sudarshan
2. Oracle Database 11g :The Complete Reference - Kevin Loney
3. Understanding ORACLE -- James T. Peary & Joseph G. Laseer.
4. RDBMS with ORACLE -- Rolland.
5. ORACLE series books of ORACLE Press – TMH.
6. Starting out with Oracle – Covering Databases -- John Day &CraigVan
7. PL/SQL, Developer Tools & DBA -- Slyke, Dreamtech
8. www.nosql-database.org
9. www.mongodb.org

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

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.5
Unit test-2	From 3.6 to 5.2.5

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

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

Course Objectives	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.

Course Outcomes	CO1	Perform object oriented programming model application design.
	CO2	Design optimized definition for an application with reusability features like inheritance and polymorphism.
	CO3	Analyze modular design for real time applications by using packages concept in projects. Able to design data structures used in applications.
	CO4	Apply multi threading concepts to implement multitasking and multi programming applications.

	CO5	Develop effective dynamic user interface for any front end applications using Applets and events.

Learning Outcomes

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

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

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

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

i) Creation of packages

ii) Design module to importing packages from other packages.

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

i) Reading data through Keyboard

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

12. Exercise programs on Collections.

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

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

13. Exercise on exception handling.

i) Programs on try, catch and finally.

ii) Programs on multiple catch statements

iii) Programs on nested try statements.

14. Exercise on multithreading

i) Programs on creation of single and multiple threads.

ii) Programs on adding priorities to multiple threads.

15. Exercise on applets

i) Programs on Graphics and colors.

ii) Simple animations using threads and graphics.

16. Exercise on AWT controls

i) Program to handle mouse events.

ii) Program to handle keyboard events.

iii) Programs to illustrate Text Fields and Button control.

iv) Programs to illustrate Check Box and List control.

v) Write an application program to illustrate multiple controls.

KEY COMPETENCIES

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

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

9	Exercise on importing packages.	Write a program to create and importing package.	(a) Create package. (b) Use of access specifiers. (b) Use package. (c) Use import keyword.
10	Exercise on interfaces.	Write a program to illustrate multiple inheritance using interfaces.	(a) Define interface. (b) Use extends keyword. (c) Use implements keyword. (d) Access interface variables.
11	Exercise programs on I/O Streams	(a) Write a program to give values to variables interactively through the keyboard. (b) Write program to read and	(a) Use different data types. (b) Use readLine() method. (c) Use println() method.
		write primitive data types. (c) Write programs to handle Files.	(d)use File Streams Observe the output.
12	Exercise programs on Collections.	(a) Write a java program to search a student mark percentage based on pin number using Array list. (b) Write a java program to create linked list to perform delete, insert, and update data in linked list with any application.	(a) Define collection classes (b) use ArrayList, LinkedList (c) apply List and Iterator Interface

13	Exercise on exception handling	(a) Write a program to illustrate exception handling. (b) Write a program to illustrate exception handling using multiple catch statements. (c) Write a program to illustrate exception handling using nested try.	(a) Use try – catch. (b) Use multiple catch blocks. (c) Use finally statement. (d) use Nested try
14	Exercise on multithreading	(a) Write a program to create single a thread by extending the thread class. (b) Write a program to create a single thread by implementing the runnable interface. (c) Write a program to create multiple threads. (d) Write a program to illustrate thread priorities.	(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
15	Exercise on applets.	Write a program to create simple applet to display	(a) Use <applet>…</applet> tag.
		different shapes with colors. Write an applet program to design simple animation.	(b) Add applet to html file. (c) Run the applet. (d) use graphics methods (e) use threads and graphics.

16	Exercise on AWT controls	(a) Write an applet program to handle key events. (b) Write an applet program to handle mouse events. (c) Write an applet program to illustrate Text Field and button control. (d) Write an applet program to illustrate Check box and List control. (e)Write an applet program to illustrate multiple controls.	(a) Use keyboard event methods (b) Use mouse event methods (c) Use Text Field class methods (d) Use button class methods (e) Use Check box and List class methods

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

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

COURSE OBJECTIVES	1. Identify all the components of mother board. 2. Modify AIMOS settings as required 3. Install drives, NIC card, modem 4. Install network devices, design and develop network. 5. Understand ip address classes and subnetting 6. Prepare cross and straight Ethernet cables 7. Install and configure proxy server 8. To learn Different Cipher Techniques 9. To Implement the Symmetric key Algorithms 10. To Implement the Asymmetric key Algorithms 11. To use the network security tools and vulnerability assessment tools

Course Outcomes	CO1	AIM-307.1	Assemble the PC with suitable components.
	CO2	AIM-307.2	Install network devices, design and develop network Install any network device and configure
	CO3	AIM-307.3	Develop the cipher techniques for encryption
	CO4	AIM-307.4	Implement symmetric key Algorithms
	CO5	AIM-307.5	Demonstrate Asymmetric key Algorithm

Learning Outcomes:

Computer Hardware

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

Computer Networking

6. Preparing the Ethernet cable for cross and direct connections using crimping tool and test using LAN tester.
7. Installation of a switch and connecting systems to a network switch.
8. Installation of a modem (internal, external or USB) and connecting to internet.
9. Using FTP for uploading and downloading files.
10. Installation and configuring the proxy server for internet access.
11. Setting of IP address to an existing terminal

CYBERSECURITY CONCEPTS:

SYMMETRIC KEY ENCRYPTION TECHNIQUES

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

ASYMMETRIC KEY ENCRYPTION TECHNIQUES

16. Perform encryption and decryption using RSA public and private key.

17. To perform the validation of the digital document using Digital signature standard encryption and decryption

18. To perform the procedure of installation process of antivirus to detect threats.

19. Learn the procedure to ensure security basic firewalls can be enabled in the system.

The competencies and key competencies to be achieved by the student

S.No.	Name of the experiment	Objectives	Key Competencies
1	Exercise on Identification and familiarization of various components of computer system.	Identification and familiarization of various components of computer system.	❖ 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 requiredfor 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 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. SSD DRIVES: ❖ Identify SSD slots ❖ How to install SSD drives
5	Exercise on recovery of lost data on hard drive.	How to recover lost data on hard drive.	❖ Verify the available recovery tools of Operating system. ❖ Know how to recover lost data on Hard drive using Restore point. ❖ Know how to recover lost data on Hard drive using Recovery Image.
6	Exercise on Preparing the Ethernet cable for cross and direct connections using crimping tool and test using LAN tester.	Preparing the Ethernet cable for cross and direct connections using crimping tool and test using cable tester.	❖ Know the color pattern of Ethernet cable for direct connection. ❖ Prepare UTP cable for direct connection using crimping tool. ❖ Check the working condition of cable using LAN tester. ❖ Know the color pattern of Ethernet cable for cross connection. ❖ Prepare UTP cable for cross connection using crimping tool. ❖ Check the working condition of cable using LAN tester.
7	Switch	Installation of switch and connect systems	❖ Install switch ❖ Connect the systems ❖ Check the validity of sharing of data in between the systems
8	Exercise on Installation of a modem (internal, external or USB) and connecting to internet.	Installation of a modem (internal, external or USB) and connecting to internet.	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
9	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

10	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.
11	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
12	To implement Transportation and Substitution using Caesar Cipher Technique	Learn to implement the Caesar Cipher Transportation Technique on information	❖ Compile program ❖ Input key value ❖ Input text to be encrypted ❖ Rectify the syntax errors ❖ We will get Encrypted text as output Check the output for correctness
13	To implement Transportation and Substitution using Playfair Cipher Technique	Learn to implement the Playfair Cipher Transportation Technique on information	❖ Compile program ❖ Input key value ❖ Input text to be encrypted ❖ Rectify the syntax errors ❖ We will get Encrypted text as output ❖ Check the output for correctness
14	To implement Transportation and Substitution using Hill Cipher Technique	Learn to implement the Hill Cipher Transportation Technique on information	❖ Input the plain text and key from the user. ❖ Split the plain text into groups of length three. ❖ Arrange the keyword in a 3*3 matrix. ❖ the two matrices to obtain the cipher text of length three. ❖ Combine all these groups to get the complete cipher text.
15	To implement Vigenere Cipher Technique	Learn to implement the Vigenere Cipher Technique on information	❖ Arrange the alphabets in row and column of a 26*26 matrix. ❖ Circulate the alphabets in each row to position left such that the first letter is attached to last. ❖ Repeat this process for all 26 rows and construct the final key matrix. ❖ The keyword and the plain text is read from the user. ❖ The characters in the keyword are repeated sequentially so as to match with that of the plaintext. Pick the first letter of the plain text and that of the keyword as the row indices and

			column indices respectively. ❖ The junction character where these two meet forms the cipher character. ❖ Repeat the above steps to generate the entire cipher text.
16	To implement Encryption and Decryptions using RSA algorithm	Learn to implement the RSA Public Key Encryption Algorithm	❖ By using RSA Public Key & Private key for Encryption and Decryption of the message ❖ By using Public key message will be ciphered ❖ By using Private key message will be deciphered ❖ Both the keys are Asymmetric
17	Implementation of Digital Signature Standard	Learn the Digital signature Implementation and its usage	❖ Read the 256-bit key values. ❖ Divide into five equal-sized blocks named A, B, C, D and E. ❖ The blocks B, C and D are passed to the function F. ❖ The resultant value is permuted with block E. ❖ The block A is shifted right by 's' times and permuted with the result of step-4. ❖ Then it is permuted with a weight value and then with some other key pair and taken as the first block. ❖ Block A is taken as the second block and the block B is shifted by 's' times and taken as the third block. ❖ blocks C and D are taken as the block D and E for the final output.
18	Study of any Antivirus Installation & Configurations Study/Demo Study of Standard Vulnerabilities.	Learn to install the Antivirus Software in Computer System and know the configuration Setting	❖ Choose the Appropriate Antivirus Software to install in the Computer System ❖ Do the Appropriate settings to configure the Antivirus software in the System. ❖ Observing System Performance While using the Antivirus software ❖ Observe the Viruses/Threats when attacked to Computer System
19	Setting firewall with Windows OS, its importance and Problems.	Study the implementation of firewall Settings in Computer system and learn how it manage the System	❖ Choose The Appropriate System settings to implement Firewall ❖ Observe the System performance while having firewall

Software requirements	❖ Linux /Windows Operating system ❖ C compiler ❖ Java Compiler

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

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

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

Course Outcomes	CO1	AIM-308.1	Develop SQL Queries to Create, modify and drop tables and Queries to Insert, update, delete data from tables.
	CO2	AIM-308.2	Execute SQL Queries to display data on different conditions from different tables
	CO3	AIM-308.3	Execute PL/SQL Programs
	CO4	AIM-308.4	Demonstrate the usage of cursors and triggers
	CO5	AIM-308.5	Execute commands to Insert, update, delete and select data in NOSQL and Mongo DB databases

LEARNING OUTCOMES

1 Know installation of Oracle
2 Exercise on creating tables.
3 Exercise on inserting records
4 Exercise on updating records
5 Exercise on modifying the structure of the table
6 Exercise on Select command
7 Exercise on querying the table using clauses like WHERE, ORDER BY, IN, AND, OR,NOT, IS NULL
8 Exercise on GROUP BY, HAVING
9 Exercise on Number functions, character functions, conversion functions and date functions, group functions
10 Exercise on set operators
11 Exercise on sub queries
12 Exercise on Joins
13 Exercise on various date and number format models
14 Exercise on creating tables with integrity constraints
15 Write programs using PL/SQL control statements
16 Exercise on Procedures
17 Exercise on Functions
18 Exercise on Cursors
19 Exercise on Triggers
20 Exercise on Installation of MongoDB
21 Exercise on Creation and Dropping of Database
22 Exercise on Creation and Dropping of Collections.
23 Exercise on Commands of MongoDB- Insert ,update , find, delete and sorting of Documents.

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

Time Schedule:

Sl.No	Name of the Experiment	Periods
1	Know installation of Oracle	1
2	Exercise on creating tables.	1
3	Exercise on inserting records	2
4	Exercise on updating records	2
5	Exercise on modifying the structure of the table	1
6	Exercise on SELECT command	2

Sl.No	Name of the Experiment	Periods
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	2
15	Write programs using PL/SQL control statements	6
16	Exercise on Procedures	2
17	Exercise on Functions	1
18	Exercise on Cursors	2
19	Exercise on Triggers	2
20	Exercise on Installation of MongoDB	1
21	Exercise on Creation and Dropping of Database	1
22	Exercise on Creation and Dropping of Collections	1
23	Exercises on commands of MongoDB	1
Total		60

KEY COMPETENCIES

Sl.No	Name of the Experiment	Objectives	Key Competencies
1	Know installation o	Perform the following: i. To identify the version of Oracle being installed ii. To understand the RAM and HDD requirements for Oracle installation iii. To comprehend the installation steps correctly iv. Setting up of Oracle Administrative Password v. Configuring the Oracle database after post-installation steps of Oracle viz configuring administrative rights for performing vi. To login to Oracle as administrator account and Oracle user account	❖ Observe Oracle version being installed ❖ Observe the RAM & HDD requirements ❖ Rectify for any Oracle installation errors ❖ Able to login as Administrator and as Oracle user account
2	Exercise on creating tables.	Perform the following: i. To login with Oracle user account ii. To give correct syntax for table creation iii. To give correct data type for the required fields with appropriate size iv. To display the structure of the table	❖ Correct Table creation syntax errors ❖ Correct the wrong data types and inappropriate sizes for the respective fields ❖ Check for displaying the structure of the table
3	Exercise on inserting records	Perform the following: i. Check for the required table present already ii. To insert the records correctly iii. To display the records correctly	❖ Correct syntax errors for Insertion of record ❖ Check for insertion of proper values for the required fields ❖ Verify the correct values pertaining to the record are inserted in the required table ❖ Check for displaying of the records correctly

Sl.No	Name of the Experiment	Objectives	Key Competencies
4	Exercise on updating records	Perform the following: i. Check for the required table present already ii. To update the records correctly iii. To display the updated records	❖ Correct syntax errors for updation of record ❖ Check for updation ❖ Check for displaying of the updated records correctly
5	Exercise on modifying the structure of the table	Perform the following i. To identify the required table present in the system already ii. To add new column iii. To display the records correctly	❖ Correct syntax errors in modifying the structure of the table ❖ Check whether required field is newly added to the existing table ❖ Check for displaying of the modified table correctly
6	Exercise on SELECT command	Perform the following i. To identify the required table present already ii. To display the records in the required table	❖ Check for syntax error in usage of Select command ❖ Check whether Select command is given correctly to display all the records
7	Exercise on querying the table using clauses like WHERE, ORDER, IN,AND, OR,NOT, IS NULL	Perform the following: i. To use the Select command ii. To use the clauses WHERE, ORDER, IN,AND, OR, NOT, IS NULL along with Select command on the given records in the table	❖ Check for syntax error in usage of Select command with appropriate clauses ❖ Check whether Select command along with appropriate clause is given correctly for the required condition ❖ Check the usage of clauses WHERE, ORDER, IN,AND, OR, NOT along with Select command appropriately
8	Exercise on GROUP BY, HAVING	Perform the following: i. To use the Select command To use the clauses GROUP BY, HAVING along with Select command on the given records in the table	❖ Check for syntax error in the usage GROUP BY, HAVING ❖ Check for usage of GROUP BY, HAVING ❖ Verify output values based on certain condition on few records

Sl.No	Name of the Experiment	Objectives	Key Competencies
9	Exercise on Number functions, character functions, conversion functions and date functions, group functions	Perform the following i. To use functions ii. To use set command along with WHERE condition, GROUP BY, HAVING	❖ Check for syntax error of various functions ❖ Check for usage of various functions ❖ Verify output values based on certain condition on few records
10	Exercise on SET operators	Perform the following iii. To use set command iv. To use set command along with WHERE condition	❖ Check for syntax error in the usage of SET command ❖ Check for usage of SET command for updating values based on certain condition on few records
11	Exercise on sub queries	Perform the following i. To use Select command ii. To use appropriate Operators IN	❖ Check for the syntax error in usage of sub queries ❖ Check for the correctness of the usage of appropriate operators used
12	Exercise on Joins	Perform the following i. To create two tables ii. To use the common field if two tables aroused iii. To know different types of Join	❖ Check for the correctness of the syntax used for joining ❖ Check if the join is created between two tables ❖ Check if self joins 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

Sl.No	Name of the Experiment	Objectives	Key Competencies
15	Write programs using PL/SQL control statements	Perform the following i. To use IF .. ELSE statements ii. To use iterative statements - Simple loop, While Loop, For Loop	❖ Check for the syntax of IF.. ELSE statements ❖ Check for the syntax of all iterative statements
16	Exercise on Procedures	Perform the following i. To know the concept ii. To declare procedures iii. The type of parameters IN,IN OUT,OUT iv. To call procedures from other procedures	❖ Check for proper declaration of procedures ❖ Check for syntax ❖ Check for proper calling of procedures
17	Exercise on Functions	Perform the following i. To know the concept ii. To declare function with return data iii. To call functions from other functions	❖ Check for proper declaration of function ❖ Check for syntax of parameters and its data type ❖ Check for proper return data type from the functions ❖ Check for variable assignment to get the returned value from the function
18	Exercise on Cursors	Perform the following i. To know the concept cursors ii. To know the fetch data from database	❖ Check for the syntax of cursor ❖ Check for open cursor, fetch data, close cursor ❖ Check for the result
19	Exercise on Triggers	Perform the following i. To know the concept of triggers ii. Validation before and after insert, before and after update and , before and after delete data	❖ Check for the syntax of trigger ❖ Write a trigger which raises before insert data ❖ Raise trigger ❖ Repeat the procedure for remaining ❖ Check for the result

Sl.No	Name of the Experiment	Objectives	Key Competencies
20	Exercise on Installation of MongoDB	Perform the following i. To download and install MongoDB	❖ Observe MongoDB version being installed ❖ Observe the RAM & HDD requirements ❖ Rectify for any MongoDB installation errors Able to login as Administrator
21	Exercise on Creation and Dropping of Database	Perform the following i. Create the Database ii. Drop the Database	❖ Know the use of create Database() and drop Database() ❖ Correct Database creation syntax errors ❖ Check for displaying the database name
22	Exercise on Creation and Dropping of Collections	Perform the following i. Create the Collection ii. Drop the Collection	❖ Know the use of create Collection() and drop() ❖ Correct Database creation syntax errors ❖ Check for collection name ❖ Check for the collection dropped
23	Exercises on commands of MongoDB	Execute the following commands of MongoDB i. Insert the Document ii. update the Document iii. find the Document iv. Delete the Document v. sort the Documents	❖ Know the syntax of insert(), update(), find(), remove(), sort() functions. ❖ Correct syntax errors. ❖ Check out for different input values.

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

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

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

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

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

LIST OF EXCERCISES:

1.Create an Android Application To display “Hello World”

2.Create an Android Application To display a Toast Message

3.Create an Android app to accept a number in textfield and display the factorial of it in a Toast message on clicking a button

4.Create an Android app to illustrate the use of CheckBoxwidget.

5.Create an Android app to illustrate the use of Spinner(ComboBox)widget.

6.Create an Android app to illustrate the use of Datepickerwidget and Timepickerwidget.

7.Create an Android app that uses multiple UI controls like EditText, CheckBox, Spinner and Buttons

8.Create an Android app to shift from one activity to another activity using abutton.

9.Create an Android Application Using Image Effects

10.Create an Android Application Using ImageSwitcher

11.Create an Android Application Using AlertDialog

12.Create an Android Application To Integrate Google Maps

13.Create an Android Application To send SMS

14.Create an Android Application To calling a number

15.Create an Android Application To send E-mail

16.Create an Android Application Using Database

17.Publish Android Application

18. Deploy Android Application

Android Programming Lab Objectives and Key Competencies			
Sl.No	**Name of the Experiment**	**Objectives**	**Key Competencies**
1	Create an Android Application To display "Hello World"	Create an Android app to show "Hello World"	❖ Correct syntactical errors ❖ Debug logical errors ❖ Confirm whether the required output generated properly or not
2	Create an Android Application To display Toast Message as "Hello World"	Create an Android app to show Toast Message as "Hello World"	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the Toast class and its required methods ❖ Confirm whether "Hello World" is displayed as Toast Message or not
3	Create an Android app to accept a number in textfield and display the factorial of it in a Toast message on clicking a button	Create an Android app to accept a number in textfield and display the factorial of it in a Toast message on clicking a button	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the EditText and Button classes and the required methods ❖ Confirm whether the factorial is computed and shown in the Toast or not
4	Exercise on Checkboxcontrol	an Android app to illustrate the use of checkbox control	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the Checkbox class and its required methods ❖ Confirm whether the selected checkbox value is shown on a Toast
5	Exercise on Spinner (ComboBox) Control	Create an Android app to illustrate the use of Spinner(ComboBox) control	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the Spinner class and its required methods ❖ Confirm whether the selected Spinner value is shown on a Toast
6	Exercise on Datepicker	Create an Android app to illustrate the use of Datepicker widget and Timepicker widget.	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the Datepicker

Android Programming Lab Objectives and Key Competencies			
Sl.No	**Name of the Experiment**	**Objectives**	**Key Competencies**
	and Timepicker		class and its required methods ❖ Confirm whether the selected date value is shown on a toast
7	Exercise on multiple UI controls	Create an Android app that uses multiple UI controls like textfield, Checkbox, Spinner and Buttons	❖ Correct syntactical errors ❖ Debug logical errors ❖ Confirm whether the required operations are done properly
8	Exercise on Intent	Create an Android app to shift from one activity to another activityusing a button.	❖ Correct syntactical errors ❖ Debug logical errors ❖ Know how to apply startActivity() method using intent ❖ Confirm whether the c moves from one activity to another activity.
9	Create an Android Application Using Image Effects	Create an Android Application Using Image Effects	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the Bitmap class ❖ Study Methods to manipulate Images ❖ Confirm whether theImage Effects are done properly or not
10	Create an Android Application Using ImageSwitcher	Create an Android Application Using ImageSwitcher	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the ImageSwitcher class ❖ Study ImageSwitcher Methods to manipulate Images ❖ Confirm whether theImage was set using ImageSwitcher methods or not
11	Create an Android Application Using AlertDialog	Create an Android Application Using AlertDialog	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the AlertDialogclass and its methods ❖ Confirm whether the Dialogs are triggered properly or not

Android Programming Lab Objectives and Key Competencies			
Sl.No	**Name of the Experiment**	**Objectives**	**Key Competencies**
12	Create an Android Application To Integrate Google Maps	Create an Android Application To Integrate Google Maps	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the Google Map class and its methods ❖ Confirm whether the Map working properly or not
13	Create an Android Application To send SMS	Create an Android Application To send SMS	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the SmsManager class and its methods ❖ Confirm whether the messages are sending properly or not
14	Create an Android Application To calling a number	Create an Android Application To calling a number	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the class and its methods ❖ Confirm whether the event performed or not
15	Create an Android Application To send E-mail	Create an Android Application To send E-mail	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the E-mail functionality with Intents ❖ Confirm whether the E-mails are sending properly or not
16	Create an Android Application Using Database	Create an Android Application Using Database	❖ Correct syntactical errors ❖ Debug logical errors ❖ Study the operations of Database ❖ Confirm whether the data is properly inserted or not ❖ Confirm whether the data is properly deleted or not ❖ Confirm whether the data is properly updated or not ❖ Confirm whether the data is properly fetched or not
17	Publish Android Application	Publish Android Application	❖ Correct syntactical errors ❖ Debug logical errors ❖ Publish an Android Application ❖ Confirm whether an Android Application

Android Programming Lab Objectives and Key Competencies			
Sl.No	**Name of the Experiment**	**Objectives**	**Key Competencies**
			published or not
18	Deploy Android Application	Deploy Android Application	❖ Correct syntactical errors ❖ Debug logical errors ❖ Deploy an Android Application ❖ Confirm whether an Android Application Deployed or not

IV SEMESTER

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SCHEME OF INSTRUCTIONS AND EXAMINATION
CURRICULUM-2023
(IV Semester)

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

AIM-401,406 is common with CM-402,406
AIM-402,407 is common with CM-505,507
AIM-404 is common with CM-401
AIM-408 is common with CM-408

WEB TECHNOLOGIES

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-401	**Web Technologies**	5	75	20	80

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Principles of Web Designing and HTML Introduction.	11	21	2	1.5	CO1
2.	Understand various HTML tags and usage of style sheets.	14	21	2	1.5	CO1,CO2
3.	Understand XML and Client side scripting using Java Script.	18	26	2	2	CO2
4.	JQuery	10	13	1	1	CO3
5.	Web servers and Server side scripting using PHP	22	29	3	2	CO4
	Total	**75**	110	10	8	

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

	CO1	Implement interactive web page(s) using HTML and CSS
	CO2	Know how to format and validate Web page elements using JavaScript and describe data in a web page using XML.

Course Outcomes	CO3	To know the Usage of JQuery
	CO4	Build Dynamic web site using server side PHP Programming and database connectivity using PHP.

LEARNING OUTCOMES:

1. **Principles of Web Designing and HTML Introduction.**

Understand the principles of Web Designing

Basic web Terminology.
Describe Anatomy of web page.
Understand different Web page elements.
Navigate through web pages
Narrate steps in building web site
Narrate steps in launching
Narrate maintaining web site.

HTML Introduction

Introduction and Overview of HTML
Discuss the rules for designing a HTML document.
Explain the structure of HTML document.
Define HTML element and Attribute.
Study the basic tags in HTML <html>, <head>, <title>, <body>.
Study the header tags <h1> to <h6>
Discuss the Physical formatting tags <b>, <i>, <u>, <strike>, <sub>, <sup>, big>, <small>, <tt>
Discuss the Logical formatting tags <q>, , <cite>, <<ins>, <del>,
Discuss the <marquee> with attributes.
List Character entities.
Explain the List tags like <ul>, <ol>, <li>, <dl>, <menu> with attributes.
Describe the setting of tables.
Describe the tags <table>, <tr>, <td>, <th>,<tbody>, <thead>, <tfoot>

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

Explain the link and imaging tags <a>, <img> with attributes.
Explain<object> tag with attributes.
Explain the tags, <form>, <input>, <button>, <label>, <select>, <options>, <textarea>, <legend> with attributes.
Explain the tags, <frame>, <frameset>, <noframe>, <iframe> with attributes.
Illustrate about cascading style sheets
Understand the level of styles inline, internal and embedded style sheets.
Explain ID and Class selectors in CSS
Explain about Color and background properties

Explain about Box properties like Border, position, margin, padding of elements.

3. **Understand XML and Java Script.**

Understand XML

Describe how to organize data in the form of XML.
Explain the rules for designing XML document.
Understand the significance of Namespace.
List the various applications of XML.

Types of scripting-JavaScript

Differentiate between Client-side and Server-side scripting.
List Client side and server side scripting languages.
Describe the features of Java Script.
Placing JavaScript code in HTML.

Understand functions

Know how to define and call a function.
Know how to pass parameters.
Understand the purpose of GetElementById method
Describe the global functions provided by JavaScript.

Form Handling in Java Script

Illustrate Arrays

Understand single and multi dimensional arrays.
Design small programs using arrays.

Understand about various Objects provided by JavaScript

Math object
String object
Date object
Boolean and **Number** object

Describe events in java script.

4. **JQuery**

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

5 **Web servers and Server side scripting using PHP.**

Web servers:

Understand the architecture of a Web server.
List the various web servers.
Illustrate the various HTTP request types and their difference.

Compare the properties of IIS, and Apache.
Understand the Fundamentals of PHP
Explain how to combine HTML and PHP.
Explain how to access HTML, PHP documents from web servers.
List various Data types and explain them with examples.
Explain how to declare Variables and Constants.
List and explain string manipulation functions.
Understand Arrays
Explain types of arrays.
Design small programs using arrays.
Explain form handling in PHP
Access elements of form using $_GET,$_POST
Know how to access Mysql Database
List and explain mysql database functions in PHP.
Explain the steps of connecting to a Database.
Know about retrieving data from a table.
Know about inserting data into a table.
Know about updating the data in a table.
Know about deleting data from a table.
Design some simple programs to insert, delete, update and retrieve data from database.
Cookies
Define Cookie.
Know how to create and delete a cookie.
Know the purpose of cookie.
Sessions
Define Session
Understand how to create a session.
Know how to destroy a session.
Know the purpose of session.
Differentiate Sessions and Cookies.
Passing data from one web page to other webpage using query string.

COURSE CONTENTS

1. Principles of Web Designing and HTML Introduction

Principles of Web Designing:

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

HTML:

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

2. HTML & CSS

Connecting to hyperlinks and Imaging, Forms, Frames, IFrame

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

Style sheets, Positioning elements, Backgrounds, Element dimensions

3. XML & JavaScript

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

JAVA SCRIPT

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

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

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

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

4. JQuery

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

5. Web servers and Server side scripting using PHP.

Web servers:

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

PHP

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

REFERENCE BOOKS

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

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

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.2
Unit test-2	From 4.1 to 5.29

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-402	Python Programming	5	75	20	80

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Introduction to Python Programming	10	26	2	2	CO1
2.	Control Flow and Loops	15	13	1	1	CO2
3.	Functions and Arrays	15	26	2	2	CO3
4.	Data Structures	15	26	2	2	CO4
5.	Object Oriented Programming in Python and File Handling and Exception Handling	20	19	3	1	CO5
	Total	**75**	110	10	8	

Course Objectives	i) To know the fundamentals of Python programming ii) To understand fundamental syntactic information about „Python" iii) To develop various python programs

Course Outcomes	CO1	AIM-402.1	Explain Basic constructs like operators, expressions and components of python programming as well as Editing and Debugging
	CO2	AIM-402.2	Write Python programs using Control statements, Loops
	CO3	AIM-402.3	Write python programs using Functions and arrays

	CO4	AIM-402.4	Develop Python programs using Data structures
	CO5	AIM-402.5	Develop Python application programs using OOP Concept, FILES, Exceptions

Learning Outcomes:

1.0 Introduction

History of Python.
List Python features
Explain Applications of Python
Describe Python Integrated Development and Learning Environment (IDLE)
Give the process of Running Python Scripts.
Explain Identifiers, Keywords, Indentation, Variables
Explain various datatypes (Int, float, Boolean, string, and list)
Explain declaration, initialization of variables.
Explain Input and Output statements.
Explain formatted input output.
State the usage of comments
Explain various Operators.
Explain Boolean values.
Explain Operator precedence rules.
State the purpose of modules.
Define functions.
List types of functions.(Built-in, User defined)
Explain Built-in Functions.
Give the Steps in Develop a simple python program and execution.

2.0 Control Flow and Loops

Explain various Control Flow constructs.
If
If-Else 2.1.3.if-
elif-else
Explain various Loop Statements.
for Loop
2.2.2.while loop
2.2.3.break
2.2.4.continue
2.2.5.pass

3.0 Functions and Arrays

Introduction
Function Arguments: Default arguments, Variable Length arguments
Anonymous Functions
Return Statement
Scope of variables: Local Variables and Global Variables
Explain creation of modules.
Explain importing of modules.
Python Variable: Namespace and scoping
Python Packages

Explain Strings: String slices, immutability
Explain String functions and methods.
Explain about String module.
Explain about Python Arrays.
Explain accessing of elements in an Array.
Explain Array methods.

4.0 Data Structures

Explain Python Lists.
Describe Basic List Operations.
Explain List Slices.
Explain List methods.
Explain List loop
Explain mutability.
Explain aliasing.
Explain Cloning lists.
Explain List parameters.
Explain List comprehension.
Tuples.
Explain Tuple assignment.
Explain Tuple as return value.
Explain Tuple Comprehension
Dictionaries
Explain creation of dictionary/assignment.
Explain Operations and methods.
Explain Dictionary Comprehension.
Explain Sets.

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

Creating Classes
Creating Objects
Method Overloading and Overriding
Data Hiding
Data Abstraction
Opening files in different modes
Processing files
Closing a file
Exception Handling

COURSE CONTENT

UNIT – I:

Introduction: Introduction to Python and installation, data types: Int, float, Boolean, string, and list; variables, Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Boolean values, expressions, statements, precedence of operators, comments; modules,

functions--- function and its use, flow of execution, parameters and arguments.

UNIT – II:

Control Flow and Loops: Control Flow- if, if-elif-else, for, while, break, continue, pass

UNIT – III:

Functions and Arrays - Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions(Function Returning Values), Scope of the Variables in a Function - Global and Local Variables, Modules: Creating modules, import statement, from Import statement, name spacing, Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages - Strings: string slices, immutability, string functions and methods, string module; Python arrays, Access the Elements of an Array, array methods.

UNIT – IV:

Data Structures : Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters, list comprehension; Tuples: tuple assignment, tuple as return value, tuple comprehension; Dictionaries: operations and methods, comprehension-sets.

UNIT – V:

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

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

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

REFERENCE BOOKS

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

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

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.7
Unit test-2	From 3.8 to 5.9

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

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Introduction to PROLOG	15	16	2	1	CO1
2.	Problems and Search Methods in AI	20	26	2	2	CO1, CO2
3.	Knowledge Representation	20	26	2	2	C01, CO3
4.	Game Theory	10	26	2	2	CO4
5.	Fuzzy Logic	10	16	2	1	CO5
	Total	**75**	110	10	8	

Course Objectives	i)	To understand PROLOG
	ii)	To know the Searching techniques of AI
	iii)	To knowledge representation using predicate logic
	iv)	To familiarize Game playing strategies and Fuzzy logic

Course Outcomes	At the end of the course the student able to learn following:		
	CO1	AIM-403.1	Describe concepts of PROLOG language
	CO2	AIM-403.2	Analyze various searching techniques
	CO3	AIM-403.3	Illustrate various knowledge representation techniques
	CO4	AIM-403.4	Explain various game paying techniques
	CO5	AIM-403.5	Explain fuzzy logic concepts

Learning Outcomes:

Introduction to PROLOG

State the need of PROLOG.
List the Key features of prolog
List the facts and rules of PROLOG
Describe how to install Prolog in Linux
List Advantages and Disadvantages of Prolog
State the Goals and terminology.
Explain Variables.
Explain Control Structures
Illustrate the usage of Arithmetic operators
State the importance of Matching in PROLOG
Explain Backtracking
List and explain the types offcuts
Explain Recursion
DefineList
Explain Lists with examples
Describe Dynamic databases
List and explain various Input/output operations
List and explain various Input and Output Streams

Problems and Search Methods in AI

Define Artificial Intelligence
List the AI Problems.
Explain Underlying Assumption.
List AI Techniques
Explain the level of model.
State the Criteria for success.
Define the problem as a state space search.
List the Problem Characteristics.
Define the production system.
Explain the Production systems.
List the Features of Production system.
Explain about Searching problems, solutions
Define Un-informed Searching strategy.
Define Informed Searching strategy
Explain Un-informed searching methods
BFS
DFS
greedy search
brute force search
Explain Informed searching methods
DFS
branch and bound
Hill climbing
constraint satisfaction searching
A*

Knowledge Representation

Define Knowledge representation
List and explain the types of Knowledge
Knowledge representation issues:
List and Explain issues in knowledge representation
Explain representation on mappings
List the approaches to knowledge representation

Predicate logic:
Define predicate logic
Illustrate simple facts in logic
Illustrate instance and ISA relationships
Describe Computable functions and predicates
Quote Resolutions

Representing knowledge as rules
Define procedural knowledge
Define Declarative knowledge
Distinguish Procedural vs Declarative knowledge
Define Logic Programming
Explain Logic programming
Explain forward reasoning
Explain Backward reasoning
Distinguish Forward vs Backward reasoning

GAME THEORY

Describe Games as Search Problems
Explain components of Search problem
Describe **Minimax** search procedures
Explain Additional refinements
Define pruning the search tree
Describe Alpha-Beta Pruning.
State the purpose of Chance Node
State the importance of Expected Value
Illustrate Games that Include an Element of Chance

FUZZY LOGIC

Define Fuzzy logic
Explain basics of fuzzy logic
State the importance of sets
Explain Fuzzy sets
State importance of crisp sets
Explain Crisp sets
State importance of fuzzy logic control
Explain Fuzzy logic control
State importance of fuzzy inference
Explain Fuzzy inference
State fuzzy hedges
Explain Fuzzy hedges
State the importance of Alpha cut threshold

Explain Alpha cut threshold
State the importance of Neuro fuzzy systems
Explain Neuro fuzzy systems
State the importance of fuzzy Bayesian networks
Explain Fuzzy Bayesian networks

COURSE CONTENTS:

UNIT1:

Introduction to PROLOG

Introduction PROLOG--facts–rules–goals–variables–control–tructures–operatorsmatching–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/

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

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-404	Software Engineering	5	75	20	80

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Basics of Software Engineering Designs & Life Cycle Models	10	16	2	1	CO1
2.	Software Project Management	18	16	2	1	CO2
3.	Requirement Analysis & Specifications	10	13	1	1	CO3
4.	Software Design, Coding	22	39	3	3	CO4
5.	Software testing, Debugging, Reliability, Quality Management & Maintenance	15	26	2	2	CO5
	Total	**75**	110	10	8	

Course Objectives	i) To know the fundamentals of software engineering & life cycle modes ii) To familiarize project managements iii) To design software projects with the help of software engineering principles and UML models

	At the end of the course the student able to learn following:		
	CO1	AIM-404.1	Explain Software life cycle models and basics of software

Course Outcomes			engineering.
	CO2	AIM-404.2	Describe Software Project Management
	CO3	AIM-404.3	Prepare SRS document
	CO4	AIM-404.4	Apply Design ,coding techniques.
	CO5	AIM-404.5	Apply Testing Techniques ,Quality and reliability metrics

Learning Outcomes:

Basics of Software Engineering Designs & Life Cycle Models

Know the Evolution and Impact of the Software Engineering

Evolution of an Art to an Engineering Discipline

A Solution to the Software Crisis?

Know the difference between Programs and Software Products

Understand the evolution of Software Engineering Design

Early Computer Programming

High Level Language Programming

Control Flow-Based Design

Data Structure-Oriented Design

Data Flow-Oriented Design

Object Oriented Design

Other Developments

Explain the Software Life Cycle Models

Classical Waterfall Model

Iterative Water fall Model

Prototyping Model

Evolutionary Model

Spiral Model

AGILE Model

Comparison of Different Life Cycle Models

Software Project Management

Software Project Manager

Job Responsibilities of a Software Project Manager

Skills Necessary for Software Project Management

Know about Software Project Planning

The SPMP Document

Metrics for Project Size Estimation

Lines of Code

Function Point Metric

Project Estimation Techniques

Empirical Estimation Technique

Heuristic Technique

Staffing Level Estimations
Nordens Work
Putnam‟s Work
Scheduling
Work Break Down Structure
Activity Networks
Gantt Charts
PERT Charts
Learn how to do Staffing
Who is a Good Software Engineer?
Risk Management
Risk Identification
Risk Assessment
Risk Containment

Requirement Analysis & Specifications

Requirements Gathering and Analysis
Software Requirement Specifications
List Contents of the SRS Document
Explain Functional Requirements
Describe Procedure to identify the Functional Requirements
How to Document the Functional Requirements
Explain requirements Traceability
List Characteristics of a Good SRS Document
Give Examples of Bad SRS Document
Explain Organization of the SRS Document

Software Design, Coding

What is a good Software Design?
Define and Classify Cohesion and Coupling
Classification of Cohesiveness
Classification of Coupling
Approaches of Software Design
Function-Oriented Design
Object-Oriented Design
Function-Oriented vs Object-Oriented Design
User Interface Design
List the Characteristics of a good User Interface
Understand the Basic Concepts
User Guidance and Online Help
Mode Based vs Modeless Interface
Graphical User Interface (GUI) vs Text-Based User Interface
Types of User Interface
Command Language Based Interface
Menu Based Interface
Direct Manipulation Interfaces
Component Based GUI Development Window System and Types ofWidgets.

Unified Modeling Language
List the goals of UML
Role of UML in Object oriented Design
List and explain Building blocks of UML
List different symbols used in UML notation
Classify and list standard UML diagrams
Know the purpose of Class diagram and draw simple class diagrams
Use case diagram
Define the term Use case
Know the purposes of Use case diagram
Learn to draw the Use case diagram
Interaction diagram
State the purpose of Interaction diagram
Interaction diagrams
List interaction diagrams(sequence & collaboration)
learn to draw the Interaction diagrams
Understand the concept of Software Coding
Coding Standards and Guidelines - Code Review- Code Walk- Throughs - Code Inspection
Clean Room Testing - Software Documentation- Software Testing

Testing, Debugging, Reliability, Quality Management & Maintenance

Understand Testing
What is Testing?
Differentiate Verification and Validation
List 3Designs of Test Cases
Compare Testing in the Large vs Testing in the Small
Explain Unit Testing
Explain Black box Testing and White Box Testing.
Explain Open source software testing tools : Selenium, Bugzilla
Debugging
Explain Debugging Approaches.
List the Debugging Guidelines.
Explain Program Analysis Tools (Static Analysis Tools& Dynamic Analysis)
List and Explain Integration Testing
Explain System Testing
Explain Performance Testing.
Understand the concept of Software Reliability
Differentiate Hardware Reliability and Software Reliability
List the different Reliability Metrics
Understand the Reliability Growth Modeling
State the importance of Statistical Testing
Explain Software Quality Management systems
Define SEI Capability Maturity Model

COURSE CONTENT

1. Introduction to Software Engineering- Life Cycle Models.

2. Software Project Management- Responsibilities of a Software Project

Manager- Project planning – Metrics-Project Estimation Techniques- Staffing Level Estimation - Scheduling – Risk Management

3. Requirement Analysis and Specification: Requirement Gathering and Analysis - SRS document

4. Software Design , Coding : Good software design, Cohesion and Coupling, Software Design Approaches, User interface Design, Software Coding and

Goals of UML - Role of UML in Object oriented Design - Building blocks of UML : Things, Relationships, and Diagrams - Symbols used in UML notation - Classify and list standard UML diagrams - Class diagram, purposes of class diagram, draw the class diagram - Use case diagram, define the term Use case, purposes of Use case diagram, draw the Use case diagram - Interaction diagram, purposes of Interaction diagram, the types of interaction diagrams : Sequence diagram and Collaboration diagram, draw the Interaction diagrams.

5. Software Testing, Debugging ,Reliability, Quality Management and maintenance – Testing, Debugging, software Reliability- Statistical Testing, Software Quality, Software Quality Management System, SEI capability Maturity Model

REFERENCE BOOKS

1. Fundamentals of Software Engineering – Rajib Mall (PHI)Second Edition.

2. Software Engineering - Jawadekar (TMH)

3. Software Engineering Concepts - Fairley (TMH)

4. Pankaj Jalote international approach to software engineering ":2nd edition

Narosal publishing house 1997

4. http://www.tutorialspoint.com/uml/

6.The Unified Modelling Language User guide…Grady Booch

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

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to 3.6
Unit test-2	From 4.1 to 5.7

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

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Introduction to Machine Learning	10	16	2	1	CO1
2.	Process of machine learning	15	26	2	2	CO2
3.	Probability and Bayesian Learning	10	16	2	1	CO3
4.	Supervised learning	20	26	2	2	CO4
5.	Unsupervised Learning	20	26	2	2	CO5
	Total	**75**	110	10	8	

Course Objectives	Upon completion of the course the student shall be able
	i) To know about the basics of machine learning ii) To Familiarize Data modelling, mathematics behind machine learning,. iii) To Analyze various supervised learning algorithms iv) To Analyze with unsupervised learning algorithms

Course Out comes	Upon completion of the course the student shall be able		
	CO1	AIM-405.1	Explain basic concepts of Machine learning
	CO2	AIM-405.2	Describe the data modelling for machine learning

	CO3	AIM-405.3	Explain the basic mathematics for machine learning
	CO4	AIM-405.4	Analyze various supervised learning algorithms of machine learning
	CO5	AIM-405.5	Analyze various unsupervised learning algorithms of machine learning

Learning Outcomes:
At the end of course student should be able to learn

Introduction to Machine Learning

Define types of Human Learning
Define machine learning
State the need of machine learning
Explain types of machine learning
Supervised learning
Unsupervised learning
Reinforcement learning
Compare supervised, unsupervised and reinforcement learning
List the problems not to be solved using machine learning
Explain the applications of machine learning towards real-life
List the tools used for machine learning
List the advantages and disadvantages of machine learning

Process of Machine Learning

Discuss the data modeling
Types of data
- Structure of the data
- Data quality and remediation

Explain the data Pre-processing
- Dimensionality reduction
- Feature subset selection

Describe learning of the data model
- Selecting a model

Training a model
- Model representation and interpretability

Analyze Performance Evaluation of a model
- Classification
- Regression
- Clustering

Discuss the performance improvement of a model.

Probability and Bayesian learning

- Explain the basic concepts of probability

Importance of statistical tools in machine learning
Concept of probability
Random Variable (Discrete and continuous)
Discrete distributions
Continuous distributions
Sampling Distributions
- Explain hypothesis testing
- Explain Baye‟s theorem

Prior
Posterior
Likelihood
Explain the Bayes Classifiers
Bayes Optimal Classifier
Naïve Bayes Classifier
List applications of Naïve Bayes Classifier.

SUPERVISED LEARNING

Discuss Classification Model
Describe the Classification learning Steps
Analyze the Classification Algorithms
k-Nearest neighbor
Working of k-NN
k-NN Algorithm
Strength and Weaknesses of the k-NN
Applications of k-NN
Decision tree
Building a Decision tree
Searching a Decision tree
Entropy and Information gain of a decision tree
Algorithm of a Decision tree
Strength and Weaknesses of decision tree
Applications of Decision tree
Random Forest
Working of random forest
Out of bag error in Random forest
Strength and Weaknesses of random forest
Applications of random forest.
Support vector Machines
Classification using hyper planes
Identifying correct hyper plane in SVM
Maximum margin hyper plane
Kernel -trick
Strength and Weaknesses of SVM
Applications of SVM
Discuss Regression
Analyze Regression Algorithms
Simple linear regression
Slope of the Simple Linear Regression Model
Simple Linear Regression Algorithm
Example of simple Linear Regression
Multiple linear Regression
Discuss Main Problems in Regression Analysis
List the applications of supervised learning

Unsupervised Learning

Compare Supervised and Unsupervised learning
Explain different types of clustering techniques

Partitioning Methods
Hierarchical Methods
Density based Methods
Analyze Clustering Algorithms
K-Means algorithm
Elbow Method
Strength and Weaknesses‟ of k-Means algorithm
k-Medoids Algorithm
Hierarchical clustering Algorithm
Agglomerative clustering
Divisive Clustering
Analyze Association Algorithm
Common terms for association rule (pattern, itemset, support, count)
Association rule
Apriori algorithm
Strengths and Weaknesses of Apriori algorithm
List the applications of Un-supervised learning

COURSE CONTENT

Introduction to machine learning

Basics of machine learning - Human Learning - Define machine learning - Types of machine learning –compare supervised, unsupervised and reinforcement learning -Problems not to be solved using machine learning -Applications of machine learning-List the Tools used for machine learning- Advantages and disadvantages of machine learning

2. Process of machine learning

Preparing to model the data - Data Preprocessing -Learning of the data model- Performance Evaluation of a model- Improving performance of a model.

3. Probability and Bayesian learning

Probability - hypothesis testing – baye‟s theorem- Bayes Classifiers

4. Supervised Learning

Classification Model-Classification learning Steps - Classification Algorithms - Introduction to Regression - Regression Algorithms - Applications of supervised learning

5. Unsupervised learning

Compare Supervised Vs Unsupervised learning - Different types of clustering techniques – clustering Algorithms - 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

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

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM- 406	Web Technologies Lab	4	60	40	60

Chapter No.	Chapter/Unit Title	No.of Periods	CO"s Mapped
1.	Exercises on HTML, CSS&XML	15	CO1
2.	Exercises on Java Script, JQuery	20	CO2,CO3
3.	Exercises on PHP web applications and Database Applications	25	CO3,CO4
	Total Periods	60	

Course Objectives	i) Understand the principles of creating an effective web page ii) To Know the working with HTML, CSS iii) To acquire knowledge and skills for creation of web site considering both client and server side iv) To familiarize the various Technologies like Java Script, JQuery, PHP. V)To understand Database connectivity Using PHP

Course Outcomes	CO1	AIM-406.1	Implement interactive web page(s) using HTML, CSS and JavaScript.
	CO2	AIM-406.2	To know the Usage of JQuery
	CO3	AIM-406.3	Build Dynamic web site using server side PHP Programming
	CO4	AIM-406.4	To know database connectivity using PHP.
	CO5	AIM-406.5	Develop real world application with different web designing tools.

LEARNING OUTCOMES

HTML, CSS and XML:

1. Exercise on basic HTML tags.
2. Design a HTML page using suitable table tags and attributes.
3. Design a HTML page with a form containing various controls.
4. Design a HTML page on iframes.
5. Exercise on style.
6. Exercise on designing a XML document.

JavaScript, AJAX & JQuery:

7. Exercise on JavaScript functions.
8. Exercise on JavaScript arrays.
9. Write a program on mouse events using JQuery.
10. Design a webpage to apply the Effects of JQuery to HTML elements.
11. Exercise on changing background color using css() function in JQuery.
12. Write a Java Script program using ResponsiveSlidesJquery plugin(download from responsiveslides.com)

PHP:

13. Install the following on local machine:
    Apache Web server
    MySQL
    PHP and configure it to work with Apache Web server and MySQL.
14. Exercise on PHP arrays.
15. Design a form and access the elements of form using PHP.
16. Write PHP program to perform various operations on a database table using functions.
17. Write a PHP program to set a cookie.

KEY COMPETENCIES

Exp. No.	Name of the experiment	Objectives	Key Competencies
1	Exercise on basic HTML tags	Create the HTML page with a title, heading, formatting and list tags in the body.	1) Identify the editor required for writing HTML 2) Add the tags with relevant content 3) Save the file 4) Open the file in a browser 5) Test the results

Exp. No.	**Name of the experiment**	**Objectives**	**Key Competencies**
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 iframes so that content in each frame will have different format and colors.	1) Identify the tags for creating multiple frames 2) Add some content to the frames and use different formats, colors for each frame. 3) Save the file 4) Open the file in a browser 5) Test the results
5	Design a style sheet to set the background color, position and dimensions of a HTML element	Create a style sheet which contains selectors to set the background color, position and dimensions of a HTML element.	6) Identify the editor required for creating CSS 7) Add selectors to set the background color, position and dimensions of an element. 8) Save the CSS file 9) Link the CSS file to a valid HTML page. 10) Save the HTML page 11) Open the HTML page in a Browser 12) Test the results
6	Exercise on designing a XML document	Create a XML Document on Student data	1) Identify the editor required for creating XML 2) Add required elements for student data 3) Save the XML file as .xml extension 4) Open the XML document in browser 5)Test the results

Exp. No.	**Name of the experiment**	**Objectives**	**Key Competencies**
7	Exercise on JavaScript functions	Write a JavaScript program using function which performs sum of two numbers and function should call when button is clicked.	1) Create a HTML file 2) Write a JavaScript function which adds two numbers. 3) Add HTML button tag and assign a function to onclick attribute. 4) Save the HTML file. 5) Open the HTML page in a browser 6) Test the results Resolve the errors if any through debugging
8	Exercise on JavaScript arrays	Write JavaScript code to implement sorting like reading an array of „n„ numbers and sorting them in ascending order.	1) Create a HTML file 2) Add elements to read array and to sort. 3) Write the logic for sorting using iterative and conditional statements. 4) Save the HTML file. 5) Open the HTML page in a browser 6) Test the results Resolve the errors if any through debugging
9	Write a program on mouse events using JQuery	Write a JavaScript program using JQuery which displays different messages for mouse events like mouse enter, mouse leave, click, 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 mouse over the div tag. 7) Resolve the errors if any through debugging
10	Design a webpage to apply the Effects of JQuery	Write a JavaScript program using JQuery which performs effects like hide, show, slideupfadeIn, fadeout,slideDown, SlideUp	1) Create a HTML file 2) Add a div tag with some content and border. 3) Add some buttons 4) Write a JQuery functions which performs some effect when click on respective button. 5) Save the HTML file. 6) Open the HTML page in a browser 7) Test the results by click on the button. Resolve the errors if any through debugging

Exp. No.	Name of the experiment	Objectives	Key Competencies
11	Exercise on changing background color using CSS properties in JQuery	Write a JavaScript program using JQuery which changes css properties like color, background-color, border etc.	1) Create a HTML file 2) Add a div tag with some content 3) Add some buttons 4) Write a JQuery functions which changes css properties like color, border when click on respective button. 5) Save the HTML file. 6) Open the HTML page in a browser 7) Test the results by click on the button. Resolve the errors if any through debugging
12	Write a JavaScript program using ResponsiveSlidesJquery plugin(download from responsiveslides.com)	Write a JavaScript program using JQuery which displays datepicker.	1) Create a HTML file 2) Add JQuery script tag. 3) Add slider plugin, which can be downloaded from http://responsiveslides.com 4) Add plugins file 5) Add images 6) Write JQuery code for display slideshow of images 7) Save the HTML file. 8) Open the HTML page in a browser 9) Test the results by click on the button. Resolve the errors if any through debugging
13	Install the following on local machine: • Apache Web server • MySQL • PHP and configure it to work with Apache Web server and MySQL.	Install a web server which supports PHP	1) Identify version compatible to system 2) Download the software 3) Install the server software 4) Configure the server 5) Write simple PHP program 6) Test the result
14	Exercise on PHP arrays	Write PHP program to implement searching like reading an array of _' n' numbers and finding smallest among them.	1) Create a PHP file. 2) Add elements to read array and to find the smallest number. 3) Write the logic for sorting using iterative and conditional statements. 4) Save and Run the page. Test the result

Exp. No.	**Name of the experiment**	**Objectives**	**Key Competencies**
15	Design a form and access the elements of form using PHP	Write a php program which displays sum of two numbers submitted by the form	1) Create a HTML file 2) Add form with two textboxes for enter two numbers 3) Write a php program, which adds two numbers submitted by form and display the sum. 4) Place the files in server 5) Open the HTML file in browser 6) Test the results
16	Write PHP code to perform various operations on a database table using functions.	Write PHP code to perform retrieval, insertion, modification and deletion of data in a database table using functions	1) Understand the process of connecting to database and execute commands. 2) Create a PHP file. 3) Add required elements to the page. 4) Write the logic to retrieve, insert, update and delete data in the table using functions. 5) Save and Run the page. 6) Test the result
17	Write a PHP program to set a cookie.	Write PHP code to create a cookie and put some information in it.	1) Understand the significance of cookies. 2) Create a PHP file. 3) Write the logic to create and seta cookie 4) Save and Run the page. 5) Test the result.

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-407	Python Programming Lab	4	60	40	60

COURSE OBJECTIVES	Upon completion of the course the student shall able to learn 15. Basics of Python programming 16. Decision Making and Functions in Python 17. Object Oriented Programming using Python.	
CO No.	COURSE OUTCOMES	
CO 1	AIM-407.1	Execute Simple python programs
CO 2	AIM-407.2	Execute Python programs using expressions, operators
CO 3	AIM-407.3	Execute python programming using Functions, packages
CO 4	AIM-407.4	Demonstrate Python programs using Lists
CO 5	AIM-407.5	Develop Python programs using OOP Concepts and exceptions
CO 6	AIM-407.6	Demonstrate Debugging of Python Programs

LEARNING OUTCOMES

1. Write and execute simple python Program.
2. Write /execute simple 'Python' program: Develop minimum 2 programs using different data types (numbers, string, tuple, list, and dictionary).
3. Write /execute simple 'Python' program: Develop minimum 2 programs using Arithmetic Operators, exhibiting data type conversion.
4. (i)Write simple programs to convert U.S. dollars to Indian rupees.
(ii) Write simple programs to convert bits to Megabytes, Gigabytes and Terabytes.
5. Write simple programs to calculate the area and perimeter of the square, and the volume & perimeter of the cone.
6. Write program to: (i) determine whether a given number is odd or even. (ii) Find the greatest of the three numbers using conditional operators.
7. Write a program to: i) Find factorial of a given number. ii) Generate multiplication table up to 10 for numbers 1 to 5.
8. Write a program to: i) Find factorial of a given number. ii) Generate multiplication table up to 10 for numbers 1 to 5 using functions.
9. Write a program to: i) Find factorial of a given number using recursion. ii) Generate Fibonacci

sequence up to 100 using recursion.
10. Write a program to: Create a list, add element to list, delete element from the lists.
11. Write a program to: Sort the list, reverse the list and counting elements in a list.
12. Write a program to: Create dictionary, add element to dictionary, delete element from the dictionary.
13. Write a program to: To calculate average, mean, median, and standard deviation of numbers in a list.
14. Write a program to: To print Factors of a given Number.
15. File Input/output: Write a program to: i) To create simple file and write "Hello World" in it. ii) To open a file in write mode and append Hello world at the end of a file.
16. Write a program to :i) To open a file in read mode and write its contents to another file but replace every occurrence of character 'h' ii) To open a file in read mode and print the number of occurrences of a character 'a'.
17. Write a Program to: Add two complex number using classes and objects.
18. Write a Program to: Subtract two complex number using classes and objects.
19. Write a Program to: Create a package and accessing a package.

KEY COMPETENCIES

Sl.No	Name of the Experiment	Objectives	Key Competencies
1.	Write and execute simple python Program.	Write a simple python program to print Hello World! and debug and execute	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 type conversion.	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 make use of function.	1. Build the termination condition for looping 2. Use while statement with correct syntax 3. Check whether correctnumber of iterations are performed by the while loop 4. Rectify the syntax errors Debug logical errors

9.	Write a program to: i) Find factorial of a given number using recursion. ii) Generate Fibonacci sequence up to 100 using recursion.	Write a Python program to make use of recursion.	1. Build the application using recursion. 2. Build the terminating condition for recursion. 3. Rectify the syntax errors 4. Debug logical errors
10.	Write a program to : To print Factors of a given Number.	Write a Python program to identify loops statements in Python.	1. Build the termination condition for looping 5. Use while statement with correct syntax 6. Check whether correct number of iterations are performed by the while loop 7. Rectify the syntax errors 1. Debug logical errors
11.	Write a programs to: Create a list, add element to list, delete element from the lists.	Write a Python program to identify various lists and list manipulation methods in Python.	1. Create a one list with correct syntax 2. Create a list 3. Read elements from list 4. Add elements to list 5. Delete elements 6. Rectify the syntax errors 7. Debug logical errors 8. Check for the correctness of output for the given input
12.	Write a programs to: Sort the list, reverse the list and counting elements in a list.	Write a Python program to identify various lists and list manipulation methods in Python.	1. Create a one list with correct syntax 2. Create a list 3. Read elements from list 4. Add elements to list 5. Delete elements 6. Rectify the syntax errors 7. Debug logical errors 8. Check for the correctness of output for the given input
13.	Write a programs to: Create dictionary, add element to dictionary, delete element from the dictionary.	Write a Python program to identify various dictionary and dictionary manipulation methods in Python.	1. Create a one dictionary with correct syntax 2. Create a dictionary 3. Read elements from list 4. Add elements to dictionary 5. Delete elements from dictionary 6. Rectify the syntax errors 7. Debug logical errors 8. Check for the correctness of output for the given input

14	Write a program to: To calculate average, mean, median, and standard deviation of numbers in a list.	Write a Python program to identify various statistical functions.	1. Create a list 2. add elements to list 3. perform statistical functions on that list
15.	File Input/output: Write a program to : i) To create simple file and write “Hello World” in it. ii) To open a file in write mode and append Hello world at the end of a file.	Write a Python program to identify the steps to create a file and append to file.	1. Create a Python file 2. Add contents to file
16	Write a program to :i) To open a file in read mode and write its contents to another file but replace every occurrence of character ‘h’ ii) To open a file in read mode and print the number of occurrences of a character ‘a’.	Write a Python program to identify the steps to open a file in read/write mode.	1. Open a Python file in write mode 2. Add contents to the file 3. Open a Python file in Read mode 4. Print the file
17.	Write a Program to: Add two complex number using classes and objects.	Write a Python program to identify the steps to create class and create an object in Python.	1. Create a class using Python 2. Create an object in Python 3. Debug the python program Check the correctness
18	Write a Program to: Subtract two complex number using classes and objects	Write a Python program to identify the steps to create class and create an object in Python.	1. Create a class using Python 2. Create an object in Python 3. Debug the python program Check the correctness
19	Write a Program to: Create a package and accessing a package.	Write a Python program to practice in creating packages and accessing packages	1. Create a package using Python 2. Access the package in Python 3. Debug the python program Check the correctness

C23-AIM-408: English Communication Skills (Lab Practice)

Course Title : English Communication Skills	**Course code: C23-AIM- 408 (Common to all Branches)**
Year/ Semester : IV Semester	**Number of Periods : 45 (3 periods per week)**
Type of Course : Practical	**Max Marks : 100 (Internal 40 + External 60)**

Course Objectives:	- to communicate effectively in diverse academic, professional and everyday situations
	- exhibit appropriate body language and etiquette at workplace
	- be employable through preparing appropriate job applications and attend interviews confidently with all necessary skills

CO No.	
CO1	Listen and comprehend the listening inputs related to different genres effectively
CO2	Communicate effectively in interpersonal interactions, interviews, group discussions and presentations
CO3	Acquire employability skills: job hunting, resume writing, attending interviews
CO4	Practise appropriate body language and professional etiquette

Course Delivery: Text book: **"English Communication Skills"**
by State Board of Technical Education and Training, AP

Chapter. No	**Unit**	**Teaching Hours**
1	Listening Skills	6
2	Workplace Etiquette	3

3	Introducing Oneself	3
4	Short presentation (JAM)	6
5	Group Discussion	6
6	Resume Writing and Cover Letter	3
7	Interview Skills	9
8	Presentation Skills	9
Total		*45*

Course Content:

UNIT I: Listening Skills **6 periods**

Pre – While- Post-listening activities- Listening to audio content (dialogues/ speech/ narrations) - answering the questions and fill in the blanks- vocabulary

UNIT 2: **Workplace Etiquette** **3 periods**

Basics of Etiquette- politeness/ courtesy, good manners- features of work place etiquette- adaptability, positive attitude, body language.

UNIT 3: Introducing Oneself **3 periods**

Speak about oneself - introduce oneself to a gathering/ formal & informal situations- Know about others- filling in the grid- introducing oneself in interviews

UNIT 4: Short Presentation **6 periods**

Dos and Don‟ts in short presentation- speak for a minute without repetition, deviation & hesitation - the techniques to speak fluently – defining and describing objects, people, phenomena, events.- speaking on randomly chosen topics.

UNIT 5: Group Discussion **6 periods**

Fundamentals of Group Discussion- Dos and Don‟ts- filling the Grid- possible list of topics- practice sessions- sample videos-Group activity

UNIT 6: Resume Writing and Cover Letter **3 periods**

Pre activity: answer the questions- jotting down biographical information- sample resumes- tips, Dos and Don‟ts- model resumes- practice exercises on Resume writing

UNIT 7: Interview Skills **9 periods**

Pre –while-post activities: - things to do at three stages – respond to notifications- know the information about the organisation-practice FAQs - preparation of good/ suitable C V, Body language, tips for success in interviews, model / mock interviews.

UNIT 8: Presentation Skills **9 periods**

Preparatory work: observe pictures and answer questions- different kinds of presentations- PPTs, Flash cards, Posters, Charts. - tips to prepare aids, slide show, model PPTs, - checklist on pre, while and post presentations.

Mapping Course Outcomes with Programme Outcomes:

PO	**1**	**2**	**3**	**4**	**5**	**6**	**7**
CO	**POs 1 to 5 are applications of Engineering Principles, can"t be directly mapped to English Communication Skills**					**1,2,3,4**	**1,2,3,4**

Unit wise Mapping of CO –PO

CO	**Course Outcome**	**COs / Unit Mapped**	**POs** mapping	**Cognitive levels as per Bloom"s Taxonomy** **R/U/A/An** **(Remembering / Understanding / Applying/ Analyising)**
CO 1	Listen and comprehend listening inputs related to different genres effectively	Unit 1	6,7	R/U/A
CO2	Communicate effectively in interpersonal interactions, interviews,	Units 3,4,5,7,8	6,7	R/U/A/An

	group discussions and presentations			
CO3	Acquire employability skills: job hunting, resume writing, attending interviews	Units 6,7	6,7	R/U/A/An
CO4	Practise appropriate body language and professional etiquette	Units 2, 3, 4,5,7,8	6,7	R/U/A

Course Code	Course title	No of periods/week	Total no of periods	Marks for FA	Marks for SA
AIM-409	**Artificial Intelligence Lab using prolog**	**03**	45	40	60

S No	Chapter/ Unit Title	No. of Periods	COs Mapped
1.	Installation and study of Prolog environment	6	CO1, CO2, CO3
2.	Study and write programs on Input/CO2, CO types, rules	15	CO1, CO2, CO3
3.	Study and write Programs on Goal finding, backtracking, objects, strings, set operations	12	CO1, CO4
4.	Programs on various applications	12	CO1, CO5
	Total	45	

COURSE OBJECTIVES	**Upon completion of the course the student shall be able to** 1. Installation & Study of prolog. 2. Use Edit, compile and execution of prolog programs 3. Usage of prolog environment 4. To Write AI program using various prolog constructs like facts, objects, predicates and variables, Goal finding, backtracking, objects, strings, set operations 5. Write AI programs on various applications using prolog

CO No		COURSE OUTCOMES
CO1	AIM-409.1	Demonstrate Installation of prolog and edit, compile and execution of simple prolog programs using statements, keywords, user defined identifiers
CO2	AIM-409.2	Practice programs using facts, objects, predicates, variables and arithmetic operators
CO3	AIM-409.3	Execute prolog program on recursion, Lists, dynamic database
CO4	AIM-409.4	Prepare Programs on Goal finding, backtracking, objects, strings, set operations
CO5	AIM-409.5	Use prolog programs on various applications

Learning outcomes:

1. Installation of GNU-Prolog, Study of Prolog (GNU-Prolog)
2. Write a prolog program of facts, objects, predicates and variables in PROLOG.
3. Write a prolog program of Rules and Unification in PROLOG.
4. Write a prolog program of "cut" and "fail" predicate in PROLOG.
5. Write a prolog program of arithmetic operators, simple input/output and compound goals in PROLOG.
6. Write a prolog program of recursion in PROLOG.
7. Write a prolog program of Lists in PROLOG.
8. Exercise on dynamic database in PROLOG.
9. Implement string operations like substring, string position, palindrome etc.
10. Write a prolog program to implement all set operations (Union, intersection, complement etc.)
11. Write a prolog program to maintain family tree.
12. Write a prolog program to solve "Water Jug Problem".
13. Write program to solve 4-queens problem.
14. Write a program for Tic-Tac-Toe problem.

KEY COMPETENCIES

Exp. No.	Name of the experiment	Objectives	Key Competencies
1	Installation of gnu-prolog	(a) Study of Prolog (gnu-prolog) (b) Installation of prolog	a) identify the errors during the installation b) observe the installation completion
2	Exercise on facts, objects, predicates and variables in PROLOG.	(a) Write a program for facts using prolog (b) Write a program objects using prolog (c) Write a program for predicates using prolog (d) Write a program for variables using prolog	(a) Compile the program and rectify the errors. (b) Execute the program (c) Observe the output.
3	Exercise on Rules and Unification in	(a) Write a program on Rules in prolog	(a) Provide the terms as input.

	PROLOG.	(b) Write program on Unification in prolog	(b) use parent method for matching terms (c) Observe the output.
4	Exercise on "cut" and "fail" predicate in PROLOG	(a) Write a program on cut in prolog (b) Write a program on fail in prolog	(a) use different methods for cut and fails predicates (b) observe the errors (c) observe the output
5	Exercise on arithmetic operators, simple input/output and compound goals in PROLOG.	Write a program on (a) arithmetic operators (b) input /output (c) goals in prolog	(a) use different terms as input (b) call the different methods (c) observe the errors (d) observe the output
6	Exercise on recursion in PROLOG	(a) Write a program using recursion in prolog	(a) Use the structures and objects (b) Understand the matching (c) Observe the errors (d) Observe the result
7	Exercise on Lists in PROLOG.	(a) Write a program on lists	(a) Use different operations like membership, length, concatenation, append, insertion (b) Check the errors (c) Observe the output
8	Exercise on dynamic database in PROLOG	(a) Write a program on database in prolog	(a) Create database (b) Use different manipulations (c) Check the errors (d) Observe the result
9	Exercise on string operations in prolog	Write a program on (a) String comparison (b) String copy (c) String reverse (d) Substring (e) Position of the string	(a) Use different string operations (b) Check the errors (c) Observe the output
10	Exercise on all set operations (Union, intersection,	(a) Write a program on set operations in	(a) Use different operations like union Intersection, difference

	complement, difference) in prolog	prolog	(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 Problem" in prolog	(a) Write a program to implement water-Jug problem.	(a) use water jug concept (b) observe the errors (c) check the output
13	Exercise on 4-queens problem in prolog	(a) Write a program to implement the 4-queens problem in prolog	(a) Use 4-queens instead of N (b) Observe the errors (c) Observe the output
14	Exercise on Tic-Tac-Toe	(a) Write a program on Tic-Tac-Toe	(a) Create the Tic-Tac-Toe (b) Check the errors (c) Observe the output

V SEMESTER

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
SCHEME OF INSTRUCTIONS AND EXAMINATION
CURRICULUM-2023
(V Semester)

Sub Code	Name of the Subject	Instruction Periods/Week		Total Periods Per Semester	Scheme Of Examinations			
		Theory	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	Big Data & Cloud Computing	5	-	75	3	20	80	100
AIM-503	Natural Language Processing	5	-	75	3	20	80	100
AIM-504	Internet of Things	5	-	75	3	20	80	100
AIM-505	Artificial Neural Networks & Deep Learning	3	-	45	3	20	80	100
PRACTICAL SUBJECTS								
AIM-506	NLP lab using Python	-	4	60	3	40	60	100
AIM-507	Machine Learning Lab	_	6	90	3	40	60	100
AIM-508	Life Skills	-	3	45	3	40	60	100
AIM-509	Project work	-	3	45	3	40	60	100
	ACTIVITIES		**3**	**45**				
	Total	**23**	**19**	**630**	**-**	**260**	**640**	**900**

AIM-501,502,504 is common with CM-501,502,504
AIM-508,509 is common with CM-508,509

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

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Principles of Management.	10	16	2	1	CO1
2	Organization Structure & Organizational Behaviour.	18	26	2	2	CO2
3.	Production Management.	18	26	2	2	CO3
4.	Engineering Ethics & Safety and Labour Codes.	19	26	2	2	CO4
5.	Entrepreneurship & Start-ups.	10	16	2	1	CO5
	Total	**75**	110	10	8	

Course Objectives and Course Outcomes

COURSEOBJECTIVES		Upon completion of the course the student shall be able to (i) Familiarize the concepts of management, and organization structures. (ii) Exposure to organizational behavioural concepts, basics of production management in industries. (iii) Exposure to Engineering Ethics, Industrial Safety, Labour codes and entrepreneurial start-ups programmes.	
COURSE	CO1	AIM-501.1	Understand the principles of management as applied to industry.
	C02	AIM-501.2	Explain types of the industrial organization structures and the behaviour of an individual in an organization, motivational and leadership styles.

OUTCOMES	C03	AIM-501.3	Explain the different aspects of production management.
	CO4	AIM-501.4	Explain Engineering Ethics, Industrial Safety and industrial Labour Codes.
	CO5	AIM-501.5	Explain Entrepreneurial development programmes and Start-ups.

CO and PO Mapping

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

3: High, 2: Moderate, 1: Low Note:

The gaps in CO and PO mapping will be achieved by one or more appropriate activities from the following:
(i) Assignments (ii) Tutorials (iii) Seminars (iv) Guest Lectures (v) Group Discussions
(vi) Quiz (vii) Industry Visits (viii) Tech-Fest (ix) Mini Projects (x) Library Visits.

Learning Outcomes

Understand the principles of management as applied to industry.

Principles of Management

Define industry, commerce (Trade) and business.
Know the need for management.
Understand functions of Management.
List the principle of scientific management by F.W.Taylor
List the principle of modern management by Henry Foyal.
Differentiate management, administration and organization
Differentiate Lower, Middle and Top level management
Explain the importance of Managerial skills (Technical, Human, Conceptual)
Know the objectives of Management Information Systems.
Know the Characteristics of Management Information Systems.

Organization Structure & Organizational Behaviour

Define organization structure.
Explain line, staff and line & staff organization structures with advantages, disadvantages and applications.
List various Motivation theories.
Explain Maslow's Hierarchy of needs.

Explain Different leadership styles.
Explain Trait theory of leadership
Explain Behavioral theory of Leadership.
Explain the Responsibility of human resource management.
Understand the process of recruitment, selection and training
State the Objectives of Job Analysis.

Production Management

Define Production, Planning and Control.
Explain Briefly Mass production, Batch production and Job order production.
Define the terms Routing, Scheduling and Dispatching.
List applications of network diagrams in production planning and control.
Draw PERT and CPM Network Diagrams – Simple Problems.
Know the functions of Materials Management.
Explain ABC analysis of Inventory.
Explain concept of Economic ordering quantity.
Explain meaning of Supply chain management.
Write processes of Supply Chain Management
List the Functions of Purchase Department.
Write functions of Stores Department.

Engineering Ethics & Safety and Labour Codes

Definition of Engineering Ethics.
Understand Core qualities of Professional Engineers.
Explain Different types of Ethics in Engineering.
State the meaning of Intellectual Property Rights
List common types of Intellectual Property Rights.
List Activities of Corporate Social Responsibility (CSR).
State the need of Human values in engineering fields.
Comprehend the importance of safety at Workplace.
List Different hazards in the industry.
State the causes of accidents costs of accidents and their prevention.
List Salient features of Code on Wages, 2019.
List Salient features of Industrial Relations Code, 2020,
List Salient features of Code on Social Security, 2020
List Salient features of Occupational Safety, Health and Working Conditions Code, 2020.

5. Entrepreneurship & Start-ups

Define the word Entrepreneur and Entrepreneurship.
Explain various self - employment schemes
List the Financial assistance programmes provided by the Governments.
Explain the concept of TQM and ISO 9000 series and BIS 14000 Series.

List the Advantages and Drawbacks of ISO 9000 series of standards.
Explain the Concept of Incubation center's.
Explain Startup and its stages.
Explain Break Even Analysis to make or buy the products.
State the Importance of Branding.
State the significance of Business name, logo and tag line.
Explain the Concepts of Digital Marketing.
Know the Role of E-commerce and Social Media.

Course Content

1.0 Principles of Management

Introduction: Industry, Commerce and Trade; Definition of management; Functions of management; Principles of Scientific Management: F.W. Taylor - Principles of Modern Management: Henry Fayol; Administration organization and management; Levels of management - Managerial skills - Management Information Systems: Objectives and Characteristics.

2.0 Organization Structure & Organizational Behaviour

Organization Types: Line, Staff and Line & Staff Organizations – Maslow's motivational theory; Leadership Styles – Trait theory of leadership – Behavioural theory of Leadership.

Job Analysis - Responsibility of human resource management - Selection procedure – Training of Workers: Apprentice Training – On job training.

3. Production Management.

Production, Planning and Control – Types of Production - Routing, Scheduling and Dispatching - PERT and CPM Network Diagrams – Applications - –Calculate Project Duration and identify the critical path of the Project – Simple Problems; Functions of Materials Management - ABC analysis of Inventory. - Economic ordering quantity- Meaning of Supply Chain Management – Processes of Supply Chain Management - Functions of Purchase Department - Purchasing Procedure -Functions of Stores Department – Bin Card.

4. Engineering Ethics &Safety and Labour Codes

Engineering Ethics: Definition – Classification of Engineering Ethics - Personal and Business ethics – Value based ethics - Environmental ethics – Meaning of Intellectual Property Rights – Common types of Intellectual Property Rights - Activities of Corporate Social Responsibility (CSR).

Human values : Morals – Values –Character- Caring –Courage - Cooperation – Commitments –Empathy – Honesty- Integrity - Respect for others – Sharing–Service learning.

Industrial Safety: The importance of safety at Workplace -Hazard and accident - Different hazards in the industry -The causes of accidents and prevention of accidents - Direct and indirect cost of accidents.

Industrial Labour Codes: Meaning of Employer and Employee - Objectives of Industrial Labour Codes – Salient features of Code on Wages, 2019 - Salient features of Industrial Relations Code, 2020 - Salient features of Code on Social Security, 2020 - Salient features of Occupational Safety, Health and Working Conditions Code, 2020.

5. Entrepreneurship & Start-ups

Entrepreneur - Entrepreneurship - Role of Entrepreneur - Qualities of an entrepreneur- Requirements of an entrepreneur - Expectations of Entrepreneurship - Self-employment schemes - Institutional support - Concept of TQM –Pillars of TQM- Importance of ISO 9000 certification - Concepts of ISO 9000 Series and BIS 14000 Series- Advantages and Drawbacks of ISO 9000 series of standards - List the beneficiaries of ISO 9000.

Financial assistance programmes - Concept of Incubation center's – Start-up and its stages — Make or Buy Decision – Break Even Analysis - Branding – Business name, logo and tag line – Concepts of Digital Marketing - Role of E-commerce and Social Media.

REFERENCEBOOKS

1. Industrial Engineering and Management -by O.PKhanna
2. Production Management-by Buffa.
3. Engineering Economics and Management Science-by Banga& Sharma.
4. Personnel Management by Flippo.
5. Production and Operations Management–S.N.Chary
6. Converging Technologies for Smart Environments and Integrated Ecosystems IERC Book Open Access 2013 pages-54-76.

Table specifying the scope of syllabus to be covered for Unit Test-I & Unit Test-II
AIM-501 :: Industrial Management & Entrepreneurship start-ups

Unit Test	Learning Outcomes to be covered
Unit Test – I	From 1.1 to 3.12
Unit Test – II	From 4.1 to 5.12

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-502	Big Data & Cloud Computing	5	75	20	80

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Over View of Data Mining	20	29	3	2	CO1
2.	OVER VIEW OF DATA WARE HOUSING	10	13	1	1	CO2
3.	Introduction to Big Data	10	16	2	1	CO3
4.	Big Data Analytics	20	26	2	2	CO3,CO4
5.	CLOUD COMPUTING	15	26	2	2	CO3,CO5
	Total	**75**	110	10	8	

Course Objectives	i) To know the fundamentals of Data Mining ii) To know the fundamentals of Data Ware Housing iii) To familiarize with Big Data and Big Data Analytics iv) To Know Big data Technologies

	At the end of the course the student able to learn following:		
Course Outcomes	CO1	AIM-502.1	Describe Data Mining
	CO2	AIM-502.2	Explain DATA WARE HOUSING
	CO3	AIM-502.3	Describe Big Data
	CO4	AIM-502.4	Analyse functioning of various Big data Analytical techniques
	CO5	AIM-502.5	Explain Cloud computing

Learning Outcomes:

1. OVER VIEW DATA MINING
   - Define Data Mining
   - List type of Data Mining
   - List Advantages of Data Mining
   - List Disadvantages of Data Mining
   - List Applications of Data Mining
   - Challenges of Implementation in Data mining
   - Evolution of Data Mining
   - List and explain Data Mining Techniques
   - Explain Data Mining Implementation Process
   - Explaining Data Mining Architecture
   - Explain KDD- Knowledge Discovery in Databases of Data Mining
   - List and explain Data Mining tools
   - List Major Difference between Data mining and Machine learning
   - State the importance of Data Analytics
   - List and explain phases of Data Analytics
   - Difference between Data Mining and Data Analytics
   - List and explain types of Data mining techniques
   - Explain Text data mining
   - Differentiate between classification and clustering in data mining

2. OVER VIEW OF DATA WARE HOUSING
   - What is data ware housing
   - State the importance of Data Ware Housing
   - Difference between Database and Data Warehouse
   - Explain Data Warehouse Architecture
   - Explain Three-Tier Data Warehouse Architecture
   - What is Operational Data Stores?
   - Define ETL and ELT
   - List Types of Data Warehouses
   - Explain Data Ware Housing Model
   - Explain Data Warehouse Design approaches
   - State terms Meta Data, Data Mart
   - What is OLAP
   - List characteristics of OLAP
   - Differentiate between OLTP and OLAP
   - List Types of OLAP
   - Data Mining Vs Data Warehousing

3. Introduction to Big Data
   - Define bigdata
   - Evolution of data/bigdata
   - Challenges of Traditional system

   The three V„s of bigdata
   - Describe Storing Big Data
   - Selecting Big Data
   - Explain Processing of Big Data
   - Classify the structures of Big Data
   - Need of Big Data
   - List the sources of big data
   - Define Big Data Analytics

List the types of tools used in Big Data
List and explain the applications of big data
List the risks of Big Data
State the importance of Intelligent data analysis
Traditional vs. Big Data approach

4. BIG DATA ANALYTICS

State the importance of big data analytics
Explain Big Data Life Cycle
State the Methodology in Big data Analytics
List Core Deliverables
List Key Stakeholders
List the responsibilities of Data Analyst
List the basic skills necessary for data analyst
State the importance of Data Scientist
Big Data Analytic Project
Explain How to deal with Bigdata Analytic Project
State Problem Definition
Data collection
Cleansing data
Summarizing
Data exploration
Data Visualization

Big data Analytic methods

Importance of SQL in Data Analytics
Importance of Charts & Graphs

Data Analysis Tools: R Programming, Python for data analysis, Julia,SPSS, MATLAB, Octave

ADVANCED METHODS

Role of Machine Learning for Data Analysis

List association rules
State importance of Decision trees
State importance of Text Analytics

BIG DATA TECHNOLOGIES

State the importance of NOSQL
List advantages of NOSQL
Sate the importance of NEWSQL
List advantages of NEWSQL
HADOOP

- List advantages
- List Features
- List versions
- Explain Hadoop components
- Explain HADOOP Architecture

5. CLOUD COMPUTING

What is cloud computing
Advantages and disadvantages of cloud computing
Evolution of cloud computing
Draw and explain NIST Visual Model of Cloud Computing
List features of Cloud computing
List and explain components of cloud computing
List and explain Cloud computing technologies
List and explain different service models in cloud computing
Compare different service models

List and explain different deployment models or types of clouds
Differentiate between private cloud and public cloud

Compare traditional data centre and Cloud storage
Describe how data is managed in cloud(DBaaS)
Explain security concepts in cloud
What is cloud simulator and List different types

COURSE CONTENT

TEXT BOOKS

1. H.Dunham,"DataMining: Introductory and Advanced Topics" Pearson Education.
2. Sam Anahory, Dennis Murray, "Data Warehousing in the Real World : A Practical Guide for Building Decision Support Systems, Pearson Education.

REFERENCE BOOKS

1. Jiawei Han, Micheline Kamber, "Data Mining Concepts & Techniques" Elsevier.
2. Mallach,"Data Warehousing System",McGraw -Hill.

Reference Websites:
https://www.javatpoint.com/aggregation-in-data-mining

https://www.javatpoint.com/data-warehouse

https://www.javatpoint.com/cloud-computing-technologies

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

Unit Test	Learning outcomes to be covered
Unit test-1	1.1 to 3.8
Unit test-2	3.9 to 5.6.9

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-503	Natural Language Processing	5	75	20	80

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Introduction to Natural Language Processing	15	16	2	1	CO1
2.	Word Level Analysis	14	26	2	2	CO2
3.	Syntactic analysis	14	16	2	1	CO3
4.	semantics and pragmatics	19	26	2	2	CO4
5.	discourse analysis and lexical resources	13	26	2	2	CO5
	Total	**75**	110	10	8	

Course Objectives	i. Acquire the fundamentals of natural language processing ii. To familiarize word level analysis iii. Analyze CFG and PCFG in NLP iv. Apply the semantics of sentences and pragmatics v. Apply the NLP techniques

	At the end of the course the student able to learn following:		
Course Outcomes	CO1	AIM-503.1	Describe a given text with basic Language features
	CO2	AIM-503.2	Explain an innovative application using NLP components
	CO3	AIM-503.3	Apply a rule based system to tackle morphology/syntax of a language.

	CO4	AIM-503.4	Explain a tag set to be used for statistical processing for real-time applications.
	CO5	AIM-503.5	Compare and contrast the use of different statistical approaches for different types of NLP applications

LEARNING OUTCOMES:

INTRODUCTION TO NATURAL LANGUAGE PROCESSING.

Describe the Origins and challenges of NLP
Classification of Language Modeling
Explain Grammar-based LM
Explain Statistical LM
Describe the role of Regular Expressions
Define Finite-State Automata
State the importance of English Morphology
Explain Transducers for lexicon and rules
State the importance of Tokenization
Explain Detecting and Correcting Spelling Errors
Describe Minimum Edit Distance

WORD LEVEL ANALYSIS

Explain the usage of Unsmoothed and Smoothed N-grams
Analyze N-grams
Describe Interpolation and Backoff- Word Classes
Explain Part-of-Speech Tagging
Differentiate Rule-based Stochastic and Transformation-based tagging
Identify the Issues in PoS tagging
Compare Hidden Markov and Maximum Entropy models.

SYNTACTIC ANALYSIS

Define Context-Free Grammar
Define Grammar rules for English
Classify Treebanks
Explain Normal Forms for grammar
State the importance of Dependency Grammar
Describe the process of Syntactic Parsing
Explain the problem of Ambiguity
Explain Dynamic Programming parsing
Shallow parsing
Probabilistic CFG
Explain Probabilistic CYK algorithm
Describe Probabilistic Lexicalized CFGs

Describe the Unification of feature structures.

SEMANTICS AND PRAGMATICS

Identify the Requirements for representation
Explain the First-Order Logic
Classify Description Logics
Describe Syntax-Driven Semantic analysis approach
State the need of Semantic attachments
Define Word Senses
Explain the Relations between Words and Senses
Describe Thematic Roles
Define Selectional restrictions
Explain the process of Word Sense Disambiguation using Supervised
Identify the importance of Dictionary & Thesaurus

DISCOURSE ANALYSIS AND LEXICAL RESOURCES

Describe the procedure of Discourse segmentation
Define Coherence
Explain Anaphora Resolution using Hobbs and Centering Algorithm
State the importance of Coreference Resolution
Explain Porter Stemmer algorithm
Describe Lemmatizer
Explain the corpus
WordNet
PropBank
FrameNet
Brown Corpus
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 Python‖, 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 Java‖, O_Reilly Media, 2015.
2. Nitin Indurkhya and Fred J. Damerau, ―Handbook of Natural Language Processing, Second Edition, Chapman and Hall/CRC Press, 2010.
3. Tanveer Siddiqui, U.S. Tiwary, ―Natural Language Processing and Information Retrieval‖, Oxford University Press, 2008.

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

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

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	Introduction of IOT	12	16	2	1	CO1
2.	Data Protocols	17	26	2	2	CO1,CO2
3.	Communication Technologies	17	26	2	2	CO1,CO3
4.	Wireless Sensor Networks	17	29	3	2	CO4
5.	Role Of IOT	12	13	1	1	CO5
	Total	**75**	110	10	8	

Course Objectives	i) To assess the vision of IoT. ii) To classify Real World IoT applications in various Domains. iii) To understand design methodology for IoT platforms.

Course Outcomes	At the end of course student able to learn the following :		
	AIM-504.1	CO1	Understand the basic concepts like usage of sensors ,components and frequently used technologies of IoT from a global context
	AIM-504.2	CO2	Illustrate the application of Data protocols of IoT
	AIM-	CO3	Understand various communication technologies of

	504.3		IOT
	AIM-504.4	CO4	Illustrate the use of sensor networks in applications of various domains
	AIM-504.5	CO5	Illustrate applications of IOT

Learning Outcomes:

1: Introduction of IOT

INTRODUCTION:
Define IOT and list its Features
List the components of IoT : hardware, software, technology and protocols
List Applications ,various Technologies of IOT
List advantages and disadvantages of IoT
Describe various connecting technologies
Sensors
Need of sensor
Features of Sensors
Classify Sensors based on output, on data types
Define actuator and list its types
List and explain functional Components of IOT
Explain service oriented architecture of IOT
List IOT challenges

Various Connectivity Technologies in IOT:
6LoWPANs Technologies
Features
Addressing
List and explain different packet formats
Explain 6LoWPAN protocol stack architecture
List and Explain Routing protocols(LOADng, RPL)
RFID Technologies
What is RFID
List the features
Explain Working principle
Applications

2. DATA PROTOCOLS
Message Queue Telemetry Transport(MQTT)
Define and explain MQTT
List components, Methods, Applications
Define and explain Secure MQTT

Constrained Application Protocol (CoAP)
Define and explain CoAP
List and explain CoAP message types

Extensible Messaging and Presence Protocol(XMPP)

List Features of XMPP
Explain XMPP
Describe core XMPP Technologies
List applications of XMPP

Advanced Message Queuing Protocol (AMQP)
List Features of AMQP
Explain AMQP in detail
List applications of XMPP

3. Communication Technologies

3.1. IEEE 802.15.4
List features of IEEE 802.15.4
Explain IEEE 802.15.4
List IEEE 802.15.4 Variants
List and explain IEEE 802.15.4 Types

ZIGBEE
What is ZIGBEE
List features, components, different topologies, types, applications of ZIGBEE
Explain different topologies of ZIGBEE
Explain ZIGBEE types

Near field communication(NFC)
What is NFC
List types and applications of NFC
Explain working principle of NFC
Describe modes of operation of NFC

Bluetooth
What is the purpose of Bluetooth
List features, functions, applications of Bluetooth
Explain Bluetooth technology in detail
Describe Pico Net

4. Wireless Sensor Networks
What is Wireless Sensor Network and list its Application

List and types of Sensor networks: Single Source Single Object Detection, Single Source Multiple Object Detection, Multiple Source Single Object Detection, Multiple Source Multiple Object Detection
What are the Challenges in Wireless Sensor Networks
Explain node Behaviour in WSNs
Explain Information theoretic self-management in WSN
Applications of WSN
Explain Wireless Multimedia Sensor Networks(WMSN)
Explain Stationary Wireless Sensor Networks

Explain Mobile Wireless Sensor Networks
What is Machine to Machine Communications(M 2 M)
Lists applications ,features of M2M
List and explain M2M sensor nodes

5. ROLE OF IOT
Explain Role of IOT in automation of the following applications
State the importance of automation in IOT.
List automation applications of IOT
List advantages of IOT in automation
List disadvantages of IOT in automation
What Is The Impact Of IoT On Industrial Automation?
List Types Of Industrial Automation
Health care applications
Smart Home
Smart Cities
Smart class rooms
Smart Energy
Smart Transportation and Mobility
Smart Factory

COURSE CONTENT

UNIT1 Introduction of IOT

INTRODUCTION to IOT – Definition – Applications – Technologies – Sensor features –Types – Actuator list – Components – Challenges
Connectivity technologies - 6LoWPAN -Features - Addressing -Routing
RFID – features – working principle – Applications

UNIT2: DATA PROTOCOLS

MQTT – Definition – features – components – applications – MQTT – SMQTT
CoAP- Definition – message types
XMPP – features – core technologies – applications
AMQP- Features-applications

UNIT3 : Communication Technologies

IEEE 802.15.4 – features – variants – types
ZIGBEE –features – components – technologies – types – applications
NFC – types –modes – applications
Bluetooth - purpose -features - Technologies- applications

UNIT4: Wireless Sensor Networks

Wireless Sensor Networks- Applications -Types-Challenges-node Behaviour-Information theoretic self-management-Applications-WMSN-.
Stationary Wireless Sensor Networks-Mobile Wireless Sensor Networks-M 2 M-applications - features-sensor nodes-

UNIT5: ROLE OF IOT

Role of IOT in automation of applications - Health care -Smart Home-Smart Cities

REFERENCE BOOKS

1) https://onlinecourses-archive.nptel.ac.in/

2) Vijay Madisetti, Arshdeep Bahga, “Internet of Things: A Hands-On Approach”, Orient Blackswan Pvt., Ltd., New Delhi, 2015.

3) Waltenegus Dargie, Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice", A John Wiley and Sons, Ltd., Publication, 2010.

4) Jeeva Jose, “Internet of Things”, (ISBN: 978-93-86173-591) KBP House,1st edition,2018.

5) Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

6) Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally

7) Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr.OvidiuVermesan, Dr. Peter Friess, River Publishers

8) Internet of Things (A Hands-on-Approach) , Vijay Madisetti , ArshdeepBahga

9) 6LoWPAN: The Wireless Embedded Internet, Zach Shelby, Carsten Bormann, Wiley

10) Building the internet of things with ipv6 and mipv6, The Evolving World of M2M Communications, Daniel Minoli John Wiley & Sons

11) Recent research/white papers

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

Unit Test	Learning outcomes to be covered
Unit test-1	From 1.1 to3.2
Unit test-2	From 3.3 to 5.13

Course code	Course Title	No. of Periods/Week	Total No. of periods	Marks for FA	Marks for SA
AIM-505	ARTIFICIAL NEURAL NETWORKS AND DEEP LEARNING	3	45	20	80

Time Schedule

Chapter No.	Chapter/Unit Title	No. of Periods	Marks	No. of Short Answer Questions	No. of Essay Type Questions	CO's Mapped
1.	INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS	9	16	2	1	CO1
2.	FEED FORWARD NEURAL NETWORKS	9	16	2	1	CO2
3.	OTHER ARTIFICIAL NEURAL NETWORK ARCHITECTURES	9	26	2	2	CO3
4.	DEEP LEARNING	9	26	2	2	CO4
5.	RECUURENT NEURAL NETWORK	9	26	2	2	CO5
	Total	**45**	110	10	8	

Course Objectives	Upon completion of the course the student shall be able
	I. To introduce the fundamental techniques and principles of Neural Networks II. To study the different models in ARTIFICIAL NEURAL NETWORK and their applications III. To familiarize deep learning concepts with Convolutional and Recurrent Neural Network

Course	Upon completion of the course the student shall be able

Out comes	CO1	AIM-505.1	Explain the basic concepts in Neural Networks and applications
	CO2	AIM-505.2	Analyze feed forward networks and their training issues
	CO3	AIM-505.3	Distinguish different types of ARTIFICIAL NEURAL NETWORK architectures
	CO4	AIM-505.4	Analyze the deep learning concepts using Back Propagation Network
	CO5	AIM-505.5	Explain Recurrent neural Network models and Applications

Learning Outcomes:
At the end of course student should be able to learn

Introduction to ARTIFICIAL NEURAL NETWORK

Define Neural Networks
Understanding the biological neuron
Explain Model of Artificial neural network
Describe Types of activation Functions
Identity function
Threshold /step function
Rectified linear unit function
Sigmoid function
Hyperbolic tangent function
Explain Architectures of Neural Network
Single layer feed forward network
Multi layer feed forward network
Recurrent network
Explain Learning process in Artificial neural network
Understand Taxonomy of neural networks
Discuss real life applications of Neural networks

Feed Forward Neural networks

Explain perceptron

perceptron

perceptron Learning rule

Perceptron Function

Inputs of a perceptron

Activation functions of a perceptron

output of Perceptron

perceptron decision function

Analyze Training Algorithms
Discrete
Continuous

List Limitations of Perceptron Model
Explain Credit Assignment problem
Analyze Back propogation Algorithm

Generalized Delta Rule

Derivation of Back propogation

Summarization of back propogation

Other ARTIFICIAL NEURAL NETWORK Architectures

Explain Associative Memory
Introduction
Hopfied Network
BiDirectional Associative memory
List the Applications of Associative memory
Explain Adaptive Resonance Theory(ART)
ART1
ART2
Applications of ART
Explain Competition based Artificial neural network
Kohenen self organizing maps
Counter propagation network

DEEP LEARNING

Define Deep learning
List the Applications of Deep learning
Discuss Issues in Feed forward Networks
Temporal/ sequential Relationships
Spatial relationships
Vanishing gradient
Overfitting
Describe Deep learning networks
Convolution neural networks
Recurrent neural networks
Long short term memory networks
Support vector Machines
Explain Convolution Neural network
Convolution neural network design
Training Convolution neural network
Limitations of Convolution neural network

Recurrent Neural Networks

Define Recurrent neural networks
Distinguish Feed forward neural networks and Recurrent neural networks
List the Applications of Recurrent neural networks
Explain the Structure of RECURRENT NEURAL NETWORK
5.3.1Hopfield network
Elman network
Jordan network
Explain Limitations of RECURRENTL NEURAL NETWORK
Describe Long short-term Memory

COURSE CONTENT

UNITI INTRODUCTIONTOARTIFICIALNEURALNETWORKS 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

UNITII FEED FORWARD NEURAL NETWORKS 9

Introduction to perceptron –Training Algorithms- Perceptron – Limitations of the Perceptron – Model- Credit Assignment Problem –Back propagation (BP) Algorithm

UNITIII OTHERARTIFICIAL NEURAL NETWORKARCHITECTURES 9

Associative Memory – Exponential BAM – Adaptive Resonance Theory - ART 1 – ART2 – Applications – Neural Networks Based On Competition.

UNIT IV DEEPLEARNING

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.

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

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	**Upon On completion of the course the student shall be able to** 1. Familiarize with the fundamentals of Natural Language Processing (NLP). 2. Make use of word level analysis. 3. To know Context Free Grammar and Probabilistic Context Free Grammar in NLP. 4. Make use of the Semantics of sentences and pragmatics. 5. To know NLP techniques in Information Retrieval applications.

CO No		**COURSE OUTCOMES**
CO 1	AIM-506.1	Practice Natural Language Processing in Python Environment.
CO 2	AIM-506.2	Perform Word Level Analysis in Python.
CO 3	AIM-506.3	Perform Syntactic Analysis in Python.
CO 4	AIM-506.4	Practice Semantics and Pragmatics in Python.
CO 5	AIM-506.5	Observe Discourse Analysis and Lexical Resources in Python.

Exercises:

Suggestion:

- Use Anaconda IDE for Python Programming.
- Use common Datasets (like Student Marks for 6 different Subjects with Grades) for easy understanding.

1. Practice Installation of NLTK in python.
2. Execute Tokenise by word using NLTK in python.
3. Execute Tokenise by Sentence using NLTK in python.
4. Exercise to find Minimum number of edits (operations) required to convert „str1" into „str2" using python.
5. Practice Part of Speech Tagging with Stop words using NLTK in python.
6. Exercise on Binning method (sequential data) for data smoothing using python.
7. Practice basic tree bank structure implementation in python.
8. Exercise on Creating Shallow Tree using python.
9. Practice Fibonacci numbers using dynamic programming python.
10. Execute Correct() function using NLTK in python.
11. Exercise on Chunking using NLTK in python.
12. Exercise on Chinking using NLTK in python.
13. Practice Lemmatizing using NLTK in python.
14. Practice Stemming using NLTK in python.
15. Exercise on Making a Frequency Distribution using NLTK in python.

KEY COMPETENCIES:

Exp. No.	**Name of the experiment**	**Objectives**	**Key Competencies**
1	Installation of NLTK in python	Learns Installation of Anaconda. Learns Installation of NLTK.	• 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 smoothing	Learns data smoothing by using binning methods. • Know smoothing by bin means • Know smoothing by bin median • Know smoothing by bin boundary	• import numpy. • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
7	Basic tree bank structure implementation	Learns to search for a given key in moderate time (quicker than Linked List and slower than arrays).	• 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 usin g dynamic programming	Learns to perform recursion Fn = Fn-1 + Fn-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	• importTextBlob from textblob. • Use correct() method. • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
11	Chunking Process	Learns on the process of taking individual pieces of information and grouping them into larger units	• 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.	• Import WordNetLemmatizer from NLTK . • Use lemmatize method. • Edit and save the program • Check for the syntax errors and clear the errors • Run the program and check for the output.
14	Stemming Process	Learns the process of producing morphological variants of a root/base	• import word_tokenize from NLTK . • import PorterStemmer from NLTK . • Edit and save the program • Check for the syntax errors and clear the

		word. There are mainly two errors in stemming • over-stemming • under-stemming	errors • Run the program and check for the output.
15	Making a Frequency Distribution	Learns how frequencies are distributed over the values	• Import 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. Make use of Data sets in implementing the machine learning algorithms 3. Implementing the Algorithms on Supervised and Un-Supervised Learning 4. Implementing the single layer and multilayer neural networks

CO No		COURSE OUTCOMES
CO 1	AIM-507.1	Understand the implementation procedures for the machine learning algorithms
CO 2	AIM-507.2	Apply appropriate data sets to the Machine Learning algorithms.
CO 3	AIM-507.3	Design python programs for supervised and unsupervised learning algorithms
CO 4	AIM-507.4	Design python programs for single layer and multilayer feed forward neural networks
CO 5	AIM-507.5	Identify and apply machine learning algorithms to solve real world problems.

Exercises:

1. Exercise on installing python, scipy packages(Includes numpy, pandas, matplotlib, sklearn)
2. Exercise on basic mathematical operations on datatypes(vectors , matrices using numpy)
3. Exercise on creating, loading and saving .CSV file.
4. Exercise on Calculation of mean, median, variance, standard deviation ,quartiles, inter quartile range.
5. Exercise on basic plots using matplotlib for an example dataset
6. Exercise on data preprocessing operations on a data set.
7. Exercise on model training (Holdout, Kfold cross validation, Boot strap sampling) using SK Learn.
8. Exercise on Feature construction and feature extraction for a sample data set.
9. Exercise on Feature Subset selection for a model data set.
10. Exercise on implementing the **naive Bayesian classifier** for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier.
11. Exercise on implementing *k*-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions.
12. Demonstrate Decision Tree algorithm for finding the most specific hypothesis based on a given set of training data samples.
13. Apply decision tree based ID3 algorithm on a appropriate data set for building the decision tree and to classify a new sample.
14. Write a program to implement K-Means Clustering to classify the data set. Use an appropriate data set for building the K-Means Clustering and apply this knowledge to classify a new sample.
15. Write a program to implement the SVM **classifier** for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier.
16. Write a program to implement the simple linear regression 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	(a) Installation of python (b)Installing scipy packages using Anaconda	a) observe the installation of the packages

2	Exercise on basic mathematical operations on datatypes	(a) Write a program for implementing vectors and matrices	(a) Compile the program and rectify the errors (b) Use numpy package (b) Execute the program (c) Observe the output for different data values
3	Exercise on creating, loading and saving .CSV file	(a) Create a data file in Excel (b) Save the file with .CSV extension (c) Load the .CSV file	(a) Create and save the .CSV file (b) loading of .CSV file (c) Compiling and executing the program (d) Observe the output
4	Exercise on Calculation of mean, median, variance, standard deviation, quartiles, inter quartile range.	(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 onbasic plots using matplot lib foran 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.	rite a program to implement feature construction rite 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 *k*-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	ite 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--15csl76
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

C23- AIM-508: Life Skills

Course Title : Life Skills	**Course code : C23- Common-508** **(Common to all Branches)**
Year/ Semester : V/ VI Semester	**Total periods : 45**
Type of Course : Lab Practice	**Max Marks : 100** **(Sessional 40 + External 60)**

Course Objectives:	understand the relevance of life skills in both personal and professional lives
	practise life skills complementarily in life-management to lead a happy and successful life

	Course Outcomes:
CO1	exhibit right attitude and be adaptable in adverse and diverse situations
CO2	set appropriate goals and achieve them through proper planning, time management and self-motivation
CO3	solve diverse real-life and professional problems with critical thinking and creativity for a stress-free life
CO4	be an ideal team player and manifest as a leader

Course Delivery:

Text book: **"Life Skills"** – by State Board of Technical Education and Training, AP

Chapter. No	**Unit**	**Teaching Hours**
1	**Attitude**	**4**
2	**Adaptability**	**4**
3	**Goal Setting**	**4**
4	**Motivation**	**4**
5	**Time Management**	**4**

6	**Critical Thinking**	**4**
7	**Creativity**	**4**
8	**Problem Solving**	**5**
9	**Team work**	**4**
10	**Leadership**	**4**
11	**Stress Management**	**4**
	Total	**45**

Course Content:

UNIT I: Attitude *matters!*
Preparatory activity-Role play; Generating word bank; Types of attitude. Read the passage and answer the related questions, read the story and discuss issues raised; Express opinions on the given topic and fill the grid with relevant words.

UNIT 2: **Adaptability… *makes life easy!***
Pair work-Study the given pictures and understand adaptability -read the anecdote and discuss, read the story and answer the questions, role play

UNIT 3: Goal Setting… *life without a goal is a rudderless boat!*
Short term goals and long term goals-SMART features, observe the pictures and answer questions- matching- read the passage and answer questions-filling the grid.

UNIT 4: Motivation… *triggers success!*
Types of motivation-difference between motivation and inspiration- matching different personalities with traits - dialogue followed by questions - writing a paragraph based on the passage.

UNIT 5: Time Management … *the need of the hour!*

Effective Time Management- Time quadrant - Group task on management of time- Time wasters-fill in the grid, read the story and answer the questions- prioritising tasks.

UNIT 6: Critical Thinking… *Logic is the key!*
Preparatory activity-read the passage and answer the questions- differentiate between facts and assumptions- components of critical thinking- complete the sets of analogies- choose the odd one out- true or false statements- decide which of the conclusions are logical.

UNIT 7: Creativity…. The essential YOU!!

Definition- Pre-activity-read the anecdote and answer the questions- matching celebrities with their fields of specialisation- think of creative uses of objects- think creatively in the given situations.

UNIT 8: Problem Solving… ***there is always a way out!***

Preparatory activity-read the story and answer the questions- discuss the given problem and come out with three alternative solutions- group activity to select the best solution among available alternatives- discuss the problem and plan to analyse it.

UNIT 9: Team Work… ***Together we are better!***

Advantages of team work- Characteristics of a team player- Activity-Observe the pictures and classify them into two groups- team game - read the story and answer the questions- fill in the grid.

UNIT 10 : Leadership… the ***making of a leader!***

Characteristics of effective leadership- styles of leadership- Activity-read the dialogue and answer the questions- identify the people in the picture and describe them- discuss leadership qualities of the given leaders- filling the grid- read the quotes and write the name of the leader.

UNIT 11: Stress Management … ***live life to the full !!***

Types of stress- Strategies for Stress Management- Activity-read the passage and answer the questions, read the situation and write a paragraph about how to manage stress.

Mapping COs with POs

POs	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Cos	**POs 1 to 5 are applications of Engineering Principles, can"t directly be mapped with Life Skills**					**1,2,3,4**	**1,2,3,4**

Unit wise Mapping of COs- POs

CO	**Course Outcome**	**CO Unit Mapped**	**PO mapped**	**Cognitive levels as per Bloom"s Taxonomy** **R/U/Ap/An/Ev/Cr**
				(Remembering / Understanding/ Applying/Analysing/ Evaluating/ Creating)
CO 1	To exhibit right attitude and be adaptable to adverse and diverse situations	All Units (1 to 11)	6,7	U/Ap/ An

CO2	To set appropriate goals and achieve them through proper planning, time management and self-motivation	Units 3,4,5	6,7	U/Ap/An
CO3	To solve diverse real-life and professional problems with critical thinking and creativity for a stress-free life	Units 6,7,8,11	6,7	U/Ap/An/ Ev/ Cr.
CO4	To be an ideal team player and manifest as a leader	Units 9,10	6,7	U/Ap/An/ Ev

Course code	Course Title	No. of Periods/Weeks	Total No. of periods	Marks for FA	Marks for SA
AIM-509	**PROJECT WORK**	3	45	40	60

Course Objectives	i)To inculcate team spirit among students ii)To apply software life cycle models iii)To design, develop, test and deploy project

	At the end of course student able to		
Course Outcomes	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.

LEARNING OUTCOMES

1. Identify different works to be carried out in the Project
2. Collect data relevant to the project work
3. Carryout need survey and identify the problem(project)
4. Select the most efficient software life cycle from the available choices based on preliminary investigation
5. Estimate the cost of project, technological need, computer skills, materials and other equipment
6. Prepare the plan and schedule of starting time and sequence of operations to be carried out at various stages of the project work in detail
7. Prepare SRS document
8. Design the required elements of the project work as per standard models such as UML
9. Develop the working software modules required for the project work
10. Prepare critical activities at various stages of the project work
11. Test ,Debug, verify and validate the project
12. Record the results
13. Preparation of project report (and user manual if necessary) to enable the client to maintain the project

Key competencies (Guide lines)

THE PROJECT CAN BE CHOSEN FROM THE FOLLOWING DOMAINS:

1. SOFTWARE PROJECTS
    a. Web site designing
    b. Banking
    c. Income tax calculation package
    d. Examinations cell.
    e. Student database management
    f. Library management
    g. Stores Management
    h. Staff data management
    i. Payrolls
    j. Inventory Control
    k. Hostel management
    l. Tourism package
    m. Institution management software
    n. Anti-Virus software development.
    o. Folder-locking.
    p. Terminate stay resident systems.

2. ARTIFICIAL INTELLIGENCE PROJECTS
    a. E-commerce
    b. Chat bots
    c. Robotics
    d. Speech recognition
    e. Machine vision
    f. Gaming
    g. Healthcare
    h. Fitness Applications
    i. Home Automation or any relevant

3. MACHINE LEARNING PROJECTS

    a. Traffic Alerts
    b. Social Media
    c. Transportation
    d. Products Recommendations
    e. Dynamic Pricing
    f. Google Translate
    g. Online Video Streaming
    h. Fraud Detection
    i. Loan Prediction or any relevant

4. To develop above projects and deploy in cloud platform
5. To develop IOT based applications
6. To maintain the software products based on the ever changing needs of and quality measures required by the clients

Evaluation Scheme for the Project Work

S. No.	Tasks	Max. Marks Allotted for each task INTERNAL /EXTERNAL (40+60=100)
1.	Feasibility study of the problem	4/6
2.	Requirement Analysis of the problem, SRS document preparation	4/8
3.	Designing the problem	6/10
4.	Implementation	8/10
5.	Testing and verification	10 /16
6.	Project report preparation and presentation	8/10
	Total:	**40/60 (100)**

VI SEMESTER

SCHEME OF INSTRUCTIONS AND EXAMINATION
CURRICULUM-2023
(VI Semester)
AIM-601 Industrial Training

SI. No.	Subject	Duration	Scheme of evaluation		
			Item	Nature	Max. Marks
1	Industrial Training	6 months	1.First Assessment at Industry (After 12 Weeks)	Assessment of learning outcomes by both the faculty and training mentor of the industry	120
			2.Second Assessment at the Industry (After 22 weeks))	Assessment of learning outcomes by both the faculty and training mentor of the industry	120
			Final Summative assessment at institution level	Training Report	20
				Demonstration of any one of the skills listed in learning outcomes	30
				Viva Voce	10
TOTAL MARKS					300

- The candidate shall put a minimum of 90% attendance during Industrial Training.
- If the student fails to secure 90% attendance during industrial training, the student shall reappear for 6 months industrial training.
- Formative assessment at industry level shall be carried out by the Mentor from of the industry, where the student is undergoing training and the faculty in charge (Guide) from the concerned section in the institution.
- The Industrial training shall carry 300 marks and pass marks is 50% in assessments at industry (first and second assessment) and final summative assessment at institution level put together i.e. 150 marks out of 300 marks.
- If the student fails to secure 50% marks in final summative assessment at institution level, the student should reappear for final summative assessment in the subsequent board examination.

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

LEARNING OUTCOMES – SCHEM OF EVALUATION (Two Online Certificate courses):

TRAINING MODULE NO.	TOPIC	LEARNING OUTCOMES (In-house training)	MARKS
First 3 Months/ 12 weeks	1) Registration at Nptel/Swayam/Moocs/course era/lectera/caltech/oxford/hckerrank/udemy … etc.,	i)Learning ii)Mini Application development iii)Report preparation iv)1st Assessment	120
Next 3 Months/ 12 Weeks	1) Registration at Nptel/Swayam/Moocs/course era/lectera/caltech/oxford/hckerrank/udemy … etc.,	i)Learning ii)Mini Application development iii)Report preparation iv)2st Assessment	120
External Evaluation	Seminar on two reports/viva	Evaluation by GUIDE/Co - Examiner,HOD and External Examiner	60
		TOTAL	300

DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNINGSCHEME OF INSTRUCTIONS AND EXAMINATION

CURRICULUM-2023
(VI Semester)
AIM-601 Industrial Training

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

LEARNING OUTCOMES (In Industry): The student shall be able to display the following skill sets

1. Apply knowledge and skill already learnt in the institution.
2. Acquire the required skills of analysis, design and development, testing, verification andvalidation.
3. Acquire skills of deployment and distribution of the product.
4. Involve in product design, development, quality, testing and maintenance production byexhibiting the strength, teamwork spirit and self-confidence
5. Prepare product documents like user manual and installation guide and operationalmanuals.
6. Perform the activities of deploying product at customer site and training the end user.
7. Maintaining the system at user site (Post product services)

S No	Unit Title	Duration	COs Mapped
1	Application of Knowledge acquired.	1 month	CO1
2	Skill Acquirement.	2 months	CO2
3	Participate in product development.	2 months	CO3
4	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.

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.

LEARNING OUTCOMES – SCHEME OF EVALUATION (Two Online Certificate courses):

TRAINING MODULE NO.	TOPIC	LEARNING OUTCOMES (In-house training)	MARKS
First 3 Months/12 weeks- First certificate	1) Registration at Nptel/ Swayam/ Moocs/course era/lectera/caltech/oxford/hackerrank/udemy… etc.,	i) Learning ii) Mini Application development iii) Report -1 preparation for First certificate iv) 1st Assessment	120
Next 3 Months/12 Weeks- Second Certificate	1) Registration at Nptel/Swayam/Moocs/course era/lectera/caltech/oxford/hackerrank/ udemy… etc.,	i) Learning ii) Mini Application development iii) Report preparation iv) 2 nd Assessment	120
External Evaluation	**Seminar on two reports**/viva	Evaluation by GUIDE/Co - Examiner, HOD and External Examiner	60
		TOTAL	300

Online Certificate courses –

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

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

Scheme of evaluation(Training at Industry)

Sl. No.	Subject	Duration	Scheme of evaluation		
			Item	Nature	Max. Marks
1	Industrial Training	6 months	1.First Assessment at Industry (After 12 Weeks)	Assessment of learning outcomes by both the faculty and training mentor of the industry	120
			2.Second Assessment at the Industry (After 20 weeks))	Assessment of learning outcomes by both the faculty and training mentor of the industry	120
			Final Summative assessment at institution level	Training Report	20
				Demonstration of any one of the skills listed in learning outcomes	30
				Viva Voce	10
TOTAL MARKS					300

The industrial training shall carry **300** marks and pass marks are **50**%.A candidate failing to secure the minimum marks should complete it at his own expenses.

During Industrial training the candidate shall put in a minimum of **75%**attendance.

Weightage of marks for Assessment of Learning Outcomes during first and second assessment (at industry)

Sl.No	Learning Outcome	Max Marks Allotted For first assessment	Max Marks Allotted For second assessment
1	Apply knowledge and skill already learnt in the institution.	50	10
2	Acquire the required skills of analysis, design and development , testing, verification and validation , deployment and distribution of the product.	70	30
3	Involve in product design, development, quality testing and maintenance production by exhibiting the strength, teamwork spirit and self-confidence	-	40
4	Prepare product document, gain the skills in deploying product at customer site , training the end user, maintaining the system.	-	40
	Total	120	120

During assessment the performance of the students shall be assessed in those skills in which the student has been trained and be awarded the marks as per the weightage assigned as above. In case the student has undergone training in a few skill sets then the total marks obtained shall be raised to 120 marks for the given assessment i.e. either assessment 1 or 2. However the performance of the student shall be assessed at the most skill sets listed above but not less than three skill sets.

Illustration for First assessment.

If the student has undergone training in only in 2 skill sets (namely 1 → for 50 marks, and 2→ for 40 marks) out of 3 (namely 1 → for 50 marks, 2→ for 40 marks and 3 → for 30 marks) in

First assessment and marks awarded during assessment is 60 out of 90 marks, then the marks of 60 shall be enhanced to 120 proportionately as (60/90)*120=80.

Illustration for second assessment .

If the student has undergone training in only in 5 skill sets (namely 1 → for 10 marks, 2→ for 20 marks , 3 - for 10 marks, 4→ for 25 marks, 5→ For 15 marks) out of 7 (namely 1 → for 10 marks, 2→ for 20 marks , 3 → For 10 marks, 4→ for 25 marks, 5→ For 15 marks, 6 → for 25 marks

and 7→ for 15 marks) in Second assessment and marks awarded during assessment is 65 out of 80 marks, then the marks of 65 shall be enhanced to 120 proportionately as (65/80)*120=97.5 = rounded to 98.

GUIDELINES FOR INDUSTRIAL TRAINING OF DIPLOMA IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING PROGRAMME

1. Duration of the training: 6 months.
2. Eligibility: The As per SBTET norms
3. Training Area: Students can be trained in either in In-house/Industry/ ***TWO Online Certificate courses***

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

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

in the areas of

4. Application Software Development / system software Development / firmware development / Mobile application development/ Database applications / Web development/ IoT application development / smart technologies / Hardware interfacing/ Networking .
5. The candidate shall put a minimum of 90% attendance during Industrial Training.
6. If the student fails to secure 90% attendance during industrial training, the student shall reappear for 6 months industrial training.
7. Formative assessment at industry level shall be carried out by the Mentor from of the industry, where the student is undergoing training and the faculty in charge (Guide) from the concerned section in the institution.
8. The Industrial training shall carry 300 marks and pass marks is 50% in assessments at industry (first and second assessment) and final summative assessment at institution level put together i.e. 150 marks out of 300 marks.
9. If the student fails to secure 50% marks in final summative assessment at institution level, the student should reappear for final summative assessment in the subsequent board examination.
10. Final summative assessment at institution level is done by a committee including1. Head of the section (of concerned discipline ONLY), 2.External examiner from an industry and 3. Faculty member who assessed the student during Industrial Training as members.

DEPARTMENT OF TECHNICAL EDUCATION
NAME OF THE INSTITUTION
INDUSTRIAL TRAINING FIRST ASSESSMENT

PIN:

NAME OF THE STUDENT:

Name of the Industry:

Skill Set Sl.No	***SKILL SET***	***Max Marks Allotted For each parameter***	***Marks obtained***
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	
	Total	*120*	

(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:

Skill Set Sl.No	***SKILL SET***	***Max Marks Allotted For each parameter***	***Marks obtained***
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: