# CURRICULUM-2020

## (C-20)

### DIPLOMA IN COMPUTER ENGINEERING


### STATE BOARD OF TECHNICAL EDUCATION & TRAINING

### ANDHRA PRADESH:: VIJAYAWADA

**DIPLOMA IN COMPUTER ENGINEERING**

**CURRICULUM-2020 ( C-20)**

**INDEX**

**CURRICULUM - 2020**

**(C-20)**

**DIPLOMA IN COMPUTER ENGINEERING**

## PREAMBLE

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

The State Board of Technical Education and Training, (SBTET) AP, has been offering Diploma programmes to meet the above said aspirations of the stake holders: industries, students, academia, parents and the society at large. As such, it has been the practice of SBTET, A.P., to keep the curriculum abreast with the advances in technology through systematic and scientific analysis of current curriculum and bring out an updated revised version at regular intervals. Accordingly,the SBTET, AP under the aegis of the Department of Technical Education, Andhra Pradesh in it's 57$^{th}$ Board Meeting held on 05-02-2019 (vide item no: 18) resolved to update the Polytechnic Curriculum C-16 with the guidance of National Institute of Technical Teachers Training & Research (NITTTR), Extension Centre, Vijayawada (ECV), to be implemented with effect from the academic year '20-21.

Analysis of Curriculum C-16 (SWOT analysis) started in the month of June-2019. Feedback was collected from all stake holders: Students, Lecturers, Senior Lecturers, Head of Sections and Principals for all programmes for this purpose. A series of workshops with subject experts followed in the subsequent weeks and the draft curricula were prepared for every programme. Finally, an interactive session with representatives from industries, academia and subject experts was held on 04.01.2020 for thorough perusal and critique of draft curricula; and the suggestions received from Industrialists and academia have been recorded, validated by another set of experienced subject teachers from the Department of Technical education for incorporation into the Curriculum C-20.

The design of new Curricula for the different diploma programmes has thus been finalised with the active participation of the members of the faculty teaching in the Polytechnics of Andhra Pradesh, and duly reviewed by Expert Committee constituted of academicians and representatives from industries. Thus, the primary objective of the curriculum change is to produce employable technicians 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 is designed to meet the requirements of NBA Accreditation, too.

The revised New Curriculum i.e., Curriculum–2020 (C-20) is approved by BoG of SBTET for its implementation with effect from 2020-21.

**Highlights of Curriculum C-20:**

1. Duration of course for regular Diploma and for sandwich Diploma is 3 years and 3½ years respectively.
2. The Curriculum is prepared in Semester Pattern. However, First Year is maintained as Year-wise pattern.
3. 6 Months Industrial training has been introduced for 3 years Diploma Courses and 6 months Industrial Training is introduced for 3 ½ years Sandwich Diploma courses.
4. Updated subjects relevant to the industry are introduced in all the Diploma courses.
5. CISCO course content has been incorporated into the ECE and CME programmes for certification from CISCO in lieu of industrial training when students are unable to get Industrial Training placement in any industry.
6. The policy decisions taken at the State and Central level with regard to environmental science are implemented by including relevant topics in Chemistry. This is also in accordance with the Supreme Court guidelines issued in Sri Mehta's case.
7. Keeping in view the increased need of communication skills which is playing a major role in the success of Diploma Level students in the Industries, emphasis is given for learning and acquiring listening, speaking, reading and writing skills in English. Further as emphasized in the meetings, Communication Skills lab and Life Skills lab are continuing for all the branches.
8. CAD specific to the branch has been given emphasis in the curriculum. Preparing drawings using CAD software has been given more importance.
9. Upon reviewing the existing C-16 curriculum, it is found that the theory content is found to have more weightage than the Practical content. In C-20 curriculum, more emphasis is given to the practical content in Laboratories and Workshops, thus strengthening the practical skills.
10. With increased emphasis for the student to acquire Practical skills, the course content in all the subjects is thoroughly reviewed and structured as outcome based than the conventional procedure based.
11. Curricula of Laboratory and Workshops have been thoroughly revised based on the suggestions received from the industry and faculty, for better utilization of the equipment available in the Polytechnics. The experiments /exercises that are chosen for the practical sessions are identified to confirm to the field requirements of industry.
12. An exclusive section for assessing Higher order Thinking skills (HOTS) has been introduced in summative evaluation.

**Acknowledgements**:

It is pertinent to acknowledge the support of the following in the making of Curriculum C-20.

A series of workshops in three phases were conducted by NITTTR, AP Extension Centre, Vijayawada involving faculty from Polytechnics, Premier Engineering Colleges & Industries to analyze the Previous C-16 Curriculum and to design C-20 Curriculum under the guidance of **Dr C. R. Nagendra Rao, Professor & Head, NITTTR-ECV**. The efforts & support extended by NITTTR to bring out final Curriculum C-20 by incorporating needs, aspiration & expectations of all stake holders is highly appreciated and gratefully acknowledged.

The Secretary, SBTET AP extends its gratitude and congratulate all the staff members who are involved and the subject experts of various branches who have contributed their services in designing this C-20 curriculum book.

The Secretary, SBTET AP is very much thankful to **Dr. Pola Bhaskar I.A.S., Commissioner of Technical Education & Chairman,SBTET, AP** for his valuable guidance to bring out this curriculum book.

The Secretary, SBTET AP is grateful to **Sri M.M. Nayak, I.A.S.,** the then **Special Commissioner of Technical Education & Chairman,SBTET, AP**. for their guidance and valuable inputs during process of revising, modifying, updating and bring it for implementing the Curriculum C-20 from 2020-21 academic year.

The Secretary, SBTET AP acknowledge with thanks the guidance & inspiration provided by **Sri. V.S. Dutt,** the then **Secretary, SBTET, Andhra Pradesh,** and other officials of State Board of Technical Education, Andhra Pradesh, experts from industry, academia from the Universities and higher learning institutions and all teaching fraternity from the Polytechnics who are directly or indirectly involved in preparation of the curriculum.

**K.VIJAYA BHASKAR**
Secretary ( FAC)
SBTET AP

## RULES AND REGULATIONS OF C-20 CURRICULUM

### 1 DURATION AND PATTERN OF THE COURSES

All the Diploma programs run at various institutions are of AICTE approved 3 years or 3½ years duration of academic instruction.

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

### 2 PROCEDURE FOR ADMISSION INTO THE DIPLOMA COURSES:

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

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

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

**b)** The candidates seeking admission should have appeared for S.S.C examination, conducted by the Board of Secondary Education, Andhra Pradesh or equivalent examination thereto, at the time of applying for the Common Entrance Test for admissions into Polytechnics (POLYCET). In case of candidates whose results of their Qualifying Examinations is pending, their selection shall be subject to production of proof of their passing the qualifying examination in one attempt or compartmentally at the time of admission.

**c)** Admissions are made based on the merit obtained in the Common Entrance Test (POLYCET) and the reservation rules stipulated by the Government of Andhra Pradesh from time to time.

**d)** For admission into the following Diploma Courses for which entry qualification is 10+2, candidates need not appear for POLYCET. A separate notification will be issued for admission into these courses.

i). D.HMCT ii).D. Pharmacy

### 3 MEDIUM OF INSTRUCTION

The medium of instruction and examination shall be English.

### 4 PERMANENT IDENTIFICATION NUMBER (PIN)

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

### 5 NUMBER OF WORKING DAYS PER SEMESTER / YEAR:

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

b) The Working days in a week shall be from Monday to Saturday

c) There shall be 7 periods of 50 minutes duration each on all working days.
d) The minimum number of working days for each semester / year shall be 90 / 180 days excluding examination days. If this prescribed minimum is not achieved due to any reason, special arrangements shall be made to conduct classes to complete the syllabus.

## 6 ELIGIBILITY (ATTENDANCE TO APPEAR FOR THE END EXAMINATION)

a) A candidate shall be permitted to appear for the end examination in all subjects, if he or she has attended a minimum of 75% of working days during the year/Semester.
b) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester or 1st year may be granted on medical grounds.
c) A stipulated fee shall be payable towards condonation for shortage of attendance.
d) Candidates having less than 65% attendance shall be detained.
e) Students whose shortage of attendance is not condoned in any semester / 1st year and not paid the condonation fee in time are not eligible to take their end examination of that class and their admissions shall stand cancelled. They may seek re-admission for that semester / 1st year when offered in the next subsequent academic semester/year.
f) For INDUSTRIAL TRAINING:
   i) During Industrial Training the candidate shall put in a minimum of 90% attendance.
   ii) If the student fails to secure 90% attendance during industrial training, the student shall reappear for 6 months industrial training at his own expenses.

## 7 READMISSION

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

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

## 8. SCHEME OF EVALUATION

### a) First Year

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

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

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

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

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

## 9 INTERNAL ASSESSMENT SCHEME

a) **Theory Courses**: Internal assessment shall be conducted for awarding sessional marks on the dates specified. **Three unit tests shall be conducted for I year students and two Unit Tests for semesters.**

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

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

**b) Practical Courses**:

(i) **Drawing Courses:**

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

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

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

**(ii) Laboratory Courses:**

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

**Evaluation for Laboratory Courses, other than drawing courses**:

i. Instruction (teaching) in laboratory courses (except for the course on Drawing) hereafter shall be task/competency based as delineated in the Laboratory sheets, prepared by SBTET, AP & NITTTR- ECV and posted in SBTET website.
ii. Internal assessment for Laboratory shall be done on the basis of tasks performed by the student as delineated in the laboratory sheets, prepared by SBTET, AP & NITTTR- ECV and posted in AP, SBTET website.
iii. Question paper for End semester Evaluation shall also be task based and shall be prepared and distributed by SBTET as done in case of theory courses is to 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. ***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 internal tests***.

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

i) Nearby Industry
ii) Govt / Semi Govt organization like R & B, PWD, PR, Railways, BSNL,APSRTC,APSEB etc.,
iii) Govt / University Engg College.
iv) HoDs from Govt. Polytechnic

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

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

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

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

| **Assessment no** | **Upon completion of** | **By** | **Based on** | **Max Marks** |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1 | 12 weeks | 1.The faculty concerned and 2. Training Mentor of the industry | Learning outcomes as given in the scheme of assessment ,for Industrial Training | 120 |
| 2 | 20-22 weeks | | | 120 |
| 3.Final summative Evaluation | 23 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** |

## 10 MINIMUM PASS MARKS

**THEORY EXAMINATION**:

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

**PRACTICAL EXAMINATION**:

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

**INDUSTRIAL ASSESSMENT**:

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

## 11. PROVISION FOR IMPROVEMENT

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

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.

**12. RULES OF PROMOTION FROM 1$^{ST}$ YEAR TO 3,$^{rd,}$ 4,$^{th}$ 5$^{th}$ ,6$^{th}$ and 7$^{th}$ SEMESTERS:**

**A) For Diploma Courses of 3 Years duration**

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

ii. A candidate shall be promoted to 3$^{rd}$ 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 3$^{rd}$ semester.

iii. A candidate shall be promoted to 4$^{th}$ semester provided he/she puts the required percentage of attendance in the 3$^{rd}$ semester and pay the examination fee. A candidate, who could not pay the 3$^{rd}$ 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 4$^{th}$ semester.

**For Regular Students:** A candidate is eligible to appear for the 4$^{th}$ semester examination if he/she

a) Puts the required percentage of attendance in the 4$^{th}$ semester
b) Should not have failed in more than four Courses ( subjects)in 1$^{st}$ year

**For IVC & ITI Lateral Entry Students:** A candidate is eligible to appear for the 4$^{th}$ semester examination if he/she

a) puts the required percentage of attendance in the 4$^{th}$ semester
b) Should have cleared at least two Courses(subjects) in third semester.

iv) A candidate shall be promoted to 5$^{th}$ semester provided he / she puts the required percentage of attendance in the 4$^{th}$ semester and pays the examination fee. A candidate, who could not pay the 4$^{th}$ 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 5$^{th}$ semester.

**For Regular Students :**A candidate is eligible to appear for the 5$^{th}$

semester examination if he/she

a) Puts the required percentage of attendance in the 5th semester
b) Should get eligibility to appear for 4th Semester examination.
c) The first backlog exam in 5th semester will be conducted only in instant/supplementary diploma examination.

**For IVC& ITI Lateral Entry students**:

a) Puts the required percentage of attendance in the 5th semester
b) Should get eligibility to appear for 4th Semester examination.
c) The first backlog exam in 5th semester will be conducted only in instant/supplementary diploma examination

v) A candidate shall be sent to Industrial training provided he/she puts in the required percentage of attendance in the 4th semester and pay the examination fee/ promotion fee as prescribed by SBTET.

**For Regular Students :** A candidate is eligible to appear for Industrial Training assessment (Seminar/Viva-voce)

a) Puts the required percentage of attendance, ie., 90% in 6th semester Industrial Training
b) Should get eligibility to appear for 5th Semester Examination

**For IVC & ITI Lateral Entry students**: A candidate is eligible to appear for Industrial Training assessment (Seminar/Viva-voce)

a) Puts the required percentage of attendance, ie., 90% in 6th semester Industrial Training.
b) Should get eligibility to appear for 5th Semester Examination.

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

i. A candidate shall be permitted to appear for 1st year examination provided he / she puts in 75% attendance (which can be condoned on Medical grounds upto 10%) i.e. attendance after condonation on Medical grounds should not be less than 65% and pay the examination fee.

ii. A candidate shall be promoted to 3rd semester if he/she puts the required percentage of attendance in the 1st year and pays the examination fee. A candidate who could not pay the 1st year examination fee has to pay the promotion fee as prescribed by State Board of Technical Education and Training from time to time before commencement of 3rd semester.

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

**For Regular students :** A candidate is eligible to appear for the 4th semester exam if he/she

a). Puts the required percentage of attendance in the 4th semester
b). Should not have failed in more than Four backlog Courses of 1st year.

**For IVC & ITI Lateral Entry students**: A candidate is eligible to appear for the 4th semester exam if he/she

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

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

v. Promotion from 5th to 6th semester is automatic (i.e., from 1st spell of Industrial Training to 2nd spell) provided he/she puts the required percentage of attendance, which in this case ie.,90 % of attendance and attends for the VIVA-VOCE examination at the end of training.

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

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

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

a) Puts in the required percentage of attendance in the 7th semester
b) Should get eligibility to appear for 4th semester Examination.

**For IVC & ITI Lateral Entry students**:

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

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

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

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

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

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

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

a) Puts in the required percentage of attendance in the 4th semester
b) Should not have failed in more than Four backlog Courses of 1st year

**For IVC & ITI Lateral Entry Students:**

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

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

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

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

**For IVC & ITI Lateral Entry students**:

a) Puts in the required percentage of attendance in the 5th semester.
b) Should not have failed in more than Four backlog Courses of 3rd Semester.

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

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

A candidate is eligible to appear for 6th semester examination

a) Puts in the required percentage of attendance in 6th semester and
b) Should get eligibility to appear for 4th Semester Examination.

**For IVC & ITI Lateral Entry students**:

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

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

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

a) Puts in the required percentage of attendance, ie., 90% in 7th semester Industrial Training
b) Should get eligibility to appear for 4th Semester Examination.

**For IVC & ITI Lateral Entry students**:

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

**Important Note:**

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

**OTHER DETAILS**

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

## 13. STUDENTS PERFORMANCE EVALUATION

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

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

## 14. EXAMINATION FEE SCHEDULE:

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

## 15. STRUCTURE OF EXAMINATION QUESTION PAPER:

**I. Formative assessment (Internal examination)**

**a) For theory Courses**:

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

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

**Part B** carries 24 marks and consists of three questions with internal choice 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 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 of 40 marks shall be conducted for first year. It consists of part A and Part B.

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

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

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

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

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

**II. Summative assessment (End examination)**

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

a) **Each theory paper consists of Section 'A', 'B' and 'C'**.

**Section 'A' with Max marks of 30,** contains 10 short answer questions. All questions are to be answered and each carries 3 marks, i.e., 10 x 3 = 30.

**Section 'B' with Max marks of 40** contains 5 essay type questions including Numerical questions (without any divisions in the question), with internal choice(Either/or type), each carrying 8 marks,
i.e., Max. Marks: 5 x 8 = 40.

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

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

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

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

## 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.

**17. MAXIMUM PERIOD FOR COMPLETION OF DIPLOMA Programmes:**

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

**18. ELIGIBILITY FOR AWARD OF DIPLOMA**

**For Regular Students:** A candidate is eligible for award of Diploma Certificate if he / she fulfil the following academic regulations.

i. He / She pursued a course of study for not less than 3 / 3 ½ academic years & not more than 6 / 7 academic years.

ii. He / she have completed all the Courses.

Students who fail to fulfil all the academic requirements for the award of the Diploma within 6 / 7 academic years from the year of admission shall forfeit their seat in the course & their seat shall stand cancelled.

**For IVC & ITI Lateral Entry students**: 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 2 / 2 ½ academic years & not more than 4 / 5 academic years.

ii. He / she has completed all the Courses.

Students who fail to fulfil all the academic requirements for the award of the Diploma within 4 / 5 academic years from the year of admission shall forfeit their seat in the course & their seat shall stand cancelled.

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

**A) FOR ISSUE OF PHOTO COPIES OF VALUED ANSWER SCRIPTS**

I. A candidate desirous of applying for Photo copy of valued answer script/s should apply within prescribed date from the date of the declaration of the result.

II. Photo copies of valued answer scripts will be issued to all theory Courses and Drawing Course(s).

III. The Photo copy of valued answer script will be dispatched to the concerned candidate's address as mentioned in the application form by post.

IV. No application can be entertained from third parties.

**B) <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.

## 20. MAL PRACTICE CASES:

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

**21. DISCREPANCIES/ PLEAS:**

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

**22. ISSUE OF DUPLICATE DIPLOMA**

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

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

**23. ISSUE OF MIGRATION CERTIFICATE AND TRANSCRIPTS:**

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

## 24.SPECIFIC CHANGES INCORPORATED IN PRESENT CURRICULUM C-20

### CME

### Changes imposed in theory subjects

1. **CM-105 , Basics of Computer Engineering(BCE) :**

   Introduced Hardware Concepts, advanced computer technologies like big data, Ethical hacking, Machine Learning, Augmented Reality, Virtual Reality and mixed reality concepts and other related VR terminology

2. **CM-302, Digital Electronics:**

   Introduced the topic Number systems (Removed in BCE and Moved to Digital Electronics)

3. **CM-305, DBMS:**

   Introduced the topic cursors and triggers in PL/SQL

4. **CM-402, Web Technologies:**

   Subject title was changed from Web Designing to Web Technologies after adding the additional topics AJAX, JQuery, Angular JS and “Form handling” in Java script as well as in PHP.

5. **CM-403, Computer Organization and Microprocessors :**

   The title is changed to Computer Organization and Microprocessors.

   Introduced the topic Fundamentals of 8086 and Microprocessors (Architecture of 8086, Architecture of Pentium and comparative study of 80286, 80386, 80486 and

Pentium processors)

6. **CM-404. OOPs Through C++:**
   Introduced new subject to enable the students to learn Object Oriented Programming concept skills
7. **CM-405. Computer Networks:**
   Introduced new subject to enable the students to learn Computer Network concepts and methodologies as per ISO/OSI standards

8. **CM-501.Industrial Management and Entrepreneurship:**
   The subject title is changed Industrial Management and Smart Technologies to Industrial Management and Entrepreneurship as the smart technology concept is already being covered in the newly introduced subject called Internet of Things,CM-504.

9. **CM-502,Java Programming:**
   A new advance topic by name “collections” is introduced to meet the current industrial standards.

10. **CM-503,Software Engineering:**
    Unified Modeling Language(UML) design concepts and case study is introduced in
    UNIT-4.

11. **CM-504. Internet Of Things:**
    Introduced new subject to make the students to learn and to become globally competitive enough with latest advancements in computer science and Engg., like sensor networks ,cloud computing, WPAN, RFID, NFC, ZIGBEE and various protocols like XMPP, COAP, etc.,

12. **CM-505. Python Programming:**
    Introduced new subject to enable the students to learn advanced programming language to develop machine learning application, GUI based applications, IOT based applications, database and web applications

## Changes imposed in the Practical subjects

1. **CM110: Computer Fundamentals Lab :**
   Introduced Adobe Photoshop exercises

**2. CM-308: DBMS Lab:**
Introduced the exercises on cursors and triggers in PL/SQL to enforce constraints and data validation and verification.

**3. CM-309: Multimedia Lab:**
Introduced the new Lab with Scribus/PageMaker, GIMP/ Photoshop, Telugu DTP, ADOBE Flash to get students acquainted with DTP and multimedia

packages which makes the passed out students to readily accept Local Jobs for immediate placements. Experiments on MS-Access are included to enable the students to work with data bases which are the prerequisite
for further courses.

**4. CM-406:Web Technologies Lab:**

Subject title was changed from Web Designing Lab to Web Technologies Lab after adding additional exercises on latest tools like AJAX, JQuery ,Angular JS and Form handling in Java Script as well as in PHP.

**5. CM-407: OOPs Through C++ Lab:**

Introduced new Lab to learn Object Oriented Programming concepts thoroughly

**6. CM-409: Computer Hardware & Network Maintenance Lab:**

Introduced new Lab to impart the skills in computer hardware maintenance and Network maintenance, Network Administration instead of mere acquiring theoretical knowledge.

**7. CM-506:Java Programming Lab:**

Programs on new advanced topic by name “collections” are introduced

**8. CM-507: Python Programming Lab:**

Introduced new Lab to enable the students to learn advanced programming language to develop machine learning applications, GUI based applications, Database and Web based real time applications

**9. CM-509: Project work:**

New practical subject introduced. The subject introduced to encourage the student’s application skills and team management skills. Student has to design, develop, test, validate and deploy the software/Hardware project which solves the real time day to day problems of individuals, organisations and IT industries.

**10. CM-601 Industrial Training:** A six month Industrial training is introduced exclusively to get training from the industries.(instead of in-house training as per ( C-16 curriculum)

**11.Mini projects are included.**

**25. GENERAL**

i. The Board may change or amend the academic rules and regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students, for whom it is intended, with effect from the dates notified by the competent authority.

ii. All legal matters pertaining to the State Board of Technical Education and Training, AP are within the jurisdiction of Vijayawada.

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

## COMPUTER ENGINEERING

### VISION

| |
|---|
| Develop Computer Engineers to be technologically adept, innovative, self-motivated and responsible citizen with human values , high quality skills and to contribute significantly towards ever changing Computer Technologies. |

### MISSION

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

| **PROGRAMME EDUCATIONAL OBJECTIVIES(PEOs)** | |
|---|---|
| Computer Engineering programme is ever changing to transform students into competent professionals with qualities, ethics and human values. On completion of the integrated programme, the students should have acquired the following characteristics | |
| PEO1 | To produce best **Diploma holders as Computer Engineering** technicians by correlating growing need of the industries in modern topics with the academic input and giving the technical knowledge for further learning and to provide better career in this field |
| PEO2 | To prepare the students as productive Computer Engineers, possessing supportive and leadership skills in multidisciplinary domains, expertise in Practical orientation, Communication Skills and latest developments. |
| PEO3 | To give the depth of related skills and expertise in a single field, and the ability to collaborate with other disciplines and work at the Supervisory cadre. |
| PEO4 | To promote the students in professionalism, by successful completion of the **Diploma in Computer Engineering** by emphasizing Field Practices in industry oriented activities. |
| PEO5 | To sensitize the students on social and economic commitment and to inculcate a nature to guard the values of community and protect environment. |

### PROGRAMME SPECIFIC OUTCOMES (PSOs)

| | |
|---|---|
| PSO1 | Foundation of Computer System: Ability to understand the principles and |

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

**PROGRAM OUTCOMES (POs)**

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

**MAPPING OF PEOs WITH MISSIONS**

| PEO | M1 | M2 | M3 | M4 |
|---|---|---|---|---|
| **T**o produce best **Diploma in Computer Engineering** technicians by correlating growing need of the industries in modern topics with the academic input and giving the technical knowledge for further learning. | ✓ | ✓ | ✓ | ✓ |
| To prepare the students as productive Computer Engineers, possessing supportive and leadership skills in multidisciplinary domains, expertise in Practical orientation, Communication Skills and latest | ✓ | ✓ | ✓ | ✓ |

| | | | | |
|---|---|---|---|---|
| developments. | | | | |
| To give the depth of related skills and expertise in a single field, and the ability to collaborate with other disciplines and work at the Supervisory cadre. | ✓ | ✓ | ✓ | ✓ |
| To promote the students in professionalism, by successful completion of the **Diploma in Computer Engineering** by emphasizing Field Practices in industry oriented activities. | ✓ | ✓ | ✓ | ✓ |
| To sensitize the students on social and economic commitment and to inculcate a nature to guard the values of community and protect environment. | ✓ | ✓ | ✓ | ✓ |

**NOTE :**

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

| Short fall in PO | Remedial measures |
|---|---|
| PO5 | By conducting<br>1)Guest lectures on motivational aspects and ethics<br>2) Concerned teacher will educate the students to follow ethics and morals in developing solutions<br>3)Providing access to Online courses like Swayam program<br>4)Seminars by senior students to the junior students to assimilate the methods followed by them to the juniors<br>5)Head of section will frequently visit and observe the activities being followed by the students to correct their behaviour and to inculcate morals and ethics |
| PO6 | They can achieve this from **industrial training** module scheduled in 6th semester of this curriculum by observing, analyzing and applying the mathematical and scientific fundamentals in solving the real time problems that will arise in day to day activities in industry. |
| PO7 | 1. Providing access to Online courses like Swayam program<br>2. By utilizing Learning Management System(LMS) established by SBTET<br>3. By subscribing e-magazines/ print magazines to the institute library and made them accessible to the students.<br>4. By arranging Guest lectures from the technical experts. |

**DIPLOMA IN COMPUTER ENGINEERING**
**SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2020**

**(FIRST YEAR)**

| Sub Code | Name of the Subject | Instruction Periods / Week | | Total Periods Per Year | Scheme Of Examinations | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Practicals | | Duration (hrs) | Sessional Marks | End Exam Marks | Total Marks |
| **THEORY SUBJECTS** | | | | | | | | |
| CM-101 | English-I | 3 | - | 90 | 3 | 20 | 80 | 100 |
| CM-102 | Engineering Mathematics - I | 5 | - | 150 | 3 | 20 | 80 | 100 |
| CM-103 | Engineering Physics | 4 | - | 120 | 3 | 20 | 80 | 100 |
| CM-104 | Engineering Chemistry and Environmental studies | 4 | - | 120 | 3 | 20 | 80 | 100 |
| CM-105 | Basics of Computer Engineering | 3 | - | 90 | 3 | 20 | 80 | 100 |
| CM-106 | Programming in C | 5 | - | 150 | 3 | 20 | 80 | 100 |
| **PRACTICAL SUBJECTS** | | | | | | | | |
| CM-107 | Engineering Drawing | - | 6 | 180 | 3 | 40 | 60 | 100 |
| CM-108 | Programming in C Lab | | 6 | 180 | 3 | 40 | 60 | 100 |
| CM-109 | Physics Lab | - | 3 | 90 | 1.5 | 20 | 30 | 50 |
| CM-110 | Chemistry Lab | - | 3 | 90 | 1.5 | 20 | 30 | 50 |
| CM-111 | Computer Fundamentals Lab | | 3 | 90 | 3 | 40 | 60 | 100 |
| | **Total** | **24** | **18** | | **-** | | | **1000** |

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

CM-106,108 common with DIT branch

**DIPLOMA IN COMPUTER ENGINEERING**
**SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2020**

**(III Semester)**

| Sub Code | Name of the Subject | Instruction Periods / Week | | Total Periods Per Semester | Scheme Of Examinations | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Practicals | | Duration (hrs) | Sessional Marks | End Exam Marks | Total Marks |
| **THEORY SUBJECTS** | | | | | | | | |
| CM-301 | Mathematics –II | 4 | | 60 | 3 | 20 | 80 | 100 |
| CM-302 | Digital Electronics | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-303 | Operating systems | 4 | - | 60 | 3 | 20 | 80 | 100 |
| CM-304 | Data Structures through C | 6 | - | 90 | 3 | 20 | 80 | 100 |
| CM-305 | DBMS | 6 | - | 90 | 3 | 20 | 80 | 100 |
| **PRACTICAL SUBJECTS** | | | | | | | | |
| CM-306 | Digital Electronics Lab | - | 3 | 45 | 3 | 40 | 60 | 100 |
| CM-307 | Data Structures Through C Lab | - | 6 | 90 | 3 | 40 | 60 | 100 |
| CM-308 | DBMS Lab | - | 4 | 60 | 3 | 40 | 60 | 100 |
| CM-309 | Multimedia Lab | | 4 | 60 | 3 | 40 | 60 | 100 |
| | **Total** | **25** | **17** | **630** | | **260** | **640** | **900** |

CM-301 common with all branches
CM-303,304,305,307,308,309 common with DIT branch

**DIPLOMA IN COMPUTER ENGINEERING**
**SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2020**

**(IV 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** | | | | | | | | |
| CM-401 | Mathematics III | 3 | - | 45 | 3 | 20 | 80 | 100 |
| CM-402 | Web Technologies | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-403 | Computer Organization And Microprocessors | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-404 | OOP through C++ | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-405 | Computer Networks | 5 | - | 75 | 3 | 20 | 80 | 100 |
| **PRACTICAL SUBJECTS** | | | | | | | | |
| CM-406 | Web Technologies Lab | - | 6 | 90 | 3 | 40 | 60 | 100 |
| CM-407 | OOP through C++ Lab | - | 4 | 60 | 3 | 40 | 60 | 100 |
| CM-408 | Communication Skills | - | 3 | 45 | 3 | 40 | 60 | 100 |
| CM-409 | Computer Hardware & Network Maintenance Lab | - | 6 | 90 | 3 | 40 | 60 | 100 |
| | **Total** | **23** | **19** | **630** | **-** | **260** | **640** | **900** |

CM-401&408 common with all branches
CM-402,406, common with DIT branch
CM405 common with IT302

**DIPLOMA IN COMPUTER ENGINEERING**
**SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2020**

**(V Semester)**

| Sub Code | Name of the Subject | Instruction Periods/Week | | Total Periods Per Semester | Scheme Of Examinations | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Practicals | | Duration (hrs) | Sessional Marks | End Exam Marks | Total Marks |
| **THEORY SUBJECTS** | | | | | | | | |
| CM-501 | Industrial Management and Entrepreneurship | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-502 | Java Programming | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-503 | Software Engineering | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-504 | Internet Of Things | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-505 | Python programming | 5 | - | 75 | 3 | 20 | 80 | 100 |
| **PRACTICAL SUBJECTS** | | | | | | | | |
| CM-506 | Java Programming Lab | - | 4 | 60 | 3 | 40 | 60 | 100 |
| CM-507 | Python Programming Lab | - | 4 | 60 | 3 | 40 | 60 | 100 |
| CM-508 | Life Skills | - | 3 | 45 | 3 | 40 | 60 | 100 |
| CM-509 | Project work | - | 6 | 90 | 3 | 40 | 60 | 100 |
| | **Total** | **25** | **17** | **630** | **-** | **260** | **640** | **900** |

Note:CM-501,502,503,506 common with DIT branch
CM-505 common with IT 404
CM-507 common with IT 407
CM-508 common with all branches

**DIPLOMA IN COMPUTER ENGINEERING**
**SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2020**

**(VI Semester)**

**CM-601 Industrial Training**

| Sl. No | Subject | Duration | Scheme of evaluation | | |
|---|---|---|---|---|---|
| | | | Item | Nature | Max. Marks |
| 1 | Industrial Training | 6 months | 1.First Assessment at Industry (After 12 Weeks) | Assessment of learning outcomes by both the faculty and training mentor of the industry | 120 |
| | | | 2.Second Assessment at the Industry (After 22 weeks)) | Assessment of learning outcomes by both the faculty and training mentor of the industry | 120 |
| | | | Final Summative assessment at institution level | Training Report | 20 |
| | | | | 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.

# FIRST YEAR

**DIPLOMA IN COMPUTER ENGINEERING**
**SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2020**

**(FIRST YEAR)**

| Sub Code | Name of the Subject | Instruction Periods/Week | | Total Periods Per Year | Scheme Of Examinations | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Practicals | | Duration (hrs) | Sessional Marks | End Exam Marks | Total Marks |
| **THEORY SUBJECTS** | | | | | | | | |
| CM-101 | English-I | 3 | - | 90 | 3 | 20 | 80 | 100 |
| CM-102 | Engineering Mathematics - I | 5 | - | 150 | 3 | 20 | 80 | 100 |
| CM-103 | Engineering Physics | 4 | - | 120 | 3 | 20 | 80 | 100 |
| CM-104 | Engineering Chemistry and Environmental studies | 4 | - | 120 | 3 | 20 | 80 | 100 |
| CM-105 | Basics of Computer Engineering | 3 | - | 90 | 3 | 20 | 80 | 100 |
| CM-106 | Programming in C | 5 | - | 150 | 3 | 20 | 80 | 100 |
| **PRACTICAL SUBJECTS** | | | | | | | | |
| CM-107 | Engineering Drawing | - | 6 | 180 | 3 | 40 | 60 | 100 |
| CM-108 | Programming in C Lab | | 6 | 180 | 3 | 40 | 60 | 100 |
| CM-109 | Physics Lab | - | 3 | 90 | 3 | 20 | 30 | 50 |
| CM-110 | Chemistry Lab | - | 3 | 90 | 3 | 20 | 30 | 50 |
| CM-111 | Computer Fundamentals Lab | | 3 | 90 | 3 | 40 | 60 | 100 |
| | **Total** | **24** | **18** | | **-** | | | **1000** |

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

CM-106,108 common with DIT branch

## English-1

| Course Code | Course Title | No. of Periods / Week | Total No. of Periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM- 101 | English-1 | 3 | 90 | 20 | 80 |

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

| CO No. | Course Outcomes |
|---|---|
| CO1 | Applies perceptions of themes related to societal responsibility of adolescents towards their surroundings. |
| CO2 | Demonstrates knowledge of form and function of ‘grammar items’ and use them in both academic and everyday situations. |

| | |
|---|---|
| CO3 | Demonstrates effective English communication skills with competence in listening, speaking, reading and writing in academic, professional and everyday contexts. |
| CO4 | Displays positivity and values of harmonious living in personal and professional spheres as reflected through communication. |

**Blue Print of Question Paper:**

| S. No. | Name of the Unit | Periods Allocated | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question Wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | English for Employability | 8 | 17 | 3 | 8* | | | 1 | 1* | 1* | | CO1, CO2, CO3, CO4 |
| 2 | Living in Harmony | 8 | | 3 | | | | 1 | | | | CO1, CO2, CO3, CO4 |
| 3 | Connect with Care | 8 | | | | 3 | | | | | | CO1, CO2, CO3, CO4 |
| 4 | Humour for Happiness | 8 | 14 | | 3 | 8* | | | 1 | 1* | | CO1, CO2, CO3, CO4 |
| 5 | Never Ever Give Up! | 8 | | | 3 | | | | 1 | | | CO1, CO2, CO3, CO4 |
| 6 | Preserve or Perish | 9 | 14 | | 8* | 3 | | | 1* | 1 | | CO1, CO2, CO3, CO4 |
| 7 | The Rainbow of Diversity | 8 | | | | 3 | 10* | | | 1 | | CO1, CO2, CO3, CO4 |
| 8 | New Challenges - Newer Ideas | 8 | 35 | | 8* | 8* + 3+ 3+ 3 | | | 1* | 4 | 1* | CO1, CO2, CO3, CO4 |
| 9 | The End Point First! | 8 | | | | | | | | | | CO1, CO2, CO3, CO4 |
| 10 | The Equal Halves | 8 | | | | | | | | | | CO1, CO2, CO3, CO4 |
| 11 | Dealing with Disasters | 9 | | | | | | | | | | CO1, CO2, CO3, CO4 |
| **TOTAL** | | **90** | **80** | **6** | **30** | **34** | **10** | **2** | **5** | **8** | **1** | |

PART-A: 10 Questions 3 marks each =30 Marks
PART-B: 5 Questions 8 marks each =40 Marks
Part-C: 1 Question 10 marks =10 Marks
(Higher Order Question)

All Questions are compulsory : 60 minutes
Internal choice : 90 minutes

No choice, one compulsory question : 30 minutes

**NOTE: * indicates questions can be given from any of the corresponding lessons in the blue print.**

**Question Paper Pattern for Unit Tests**

Part A: 16 marks: 4 questions with 1 mark each (FIB, True/false, one word/phrase, etc.)

4 questions with 3 marks each (short answer/ descriptive/ applicative questions)

Part B: 24 marks: 3 questions 8 marks each with internal choice

**Learning Outcomes**

**1. English for Employability**

1.1. Explain the need for improving communication in English for employability
1.2. Use adjectives and articles effectively while speaking and in writing
1.3. Write simple sentences

**2. Living in Harmony**

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

**3. Connect with Care**

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

**4. Humour for Happiness**

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

**5. Never Ever Give Up!**

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

**6. Preserve or Perish**

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

**7. The Rainbow of Diversity**

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

**8. New Challenges – Newer Ideas**

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

**9. The End Point First!**

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

**10. The Equal Halves**

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

**11. Dealing with Disasters**

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

**Textbook:** INTERACT (A Textbook for I Year English) - Published by SBTET, AP

**Reference Books:**


Martin Hewings : Advanced Grammar in Use, Cambridge University Press

Murphy, Raymond : English Grammar in Use,Cambridge University Press

Sidney Greenbaum : Oxford English Grammar, Oxford University Press

Wren and Martin (Revised By N.D.V. Prasad Rao) : English Grammar and Composition, Blackie ELT Books, S. Chand and Co.

Sarah Freeman : Strengthen Your Writing, Macmillan

## ENGINEERING MATHEMATICS - I

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

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

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

## ENGINEERING MATHEMATICS – I

## COMMON TO ALL BRANCHES

### Learning Outcomes

### UNIT - I

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

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

1.2 Explain Relations and functions – examples

1.3 Find Domain & Range of functions – simple examples.

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

1.5 Define inverse functions - examples.

1.6 Define rational, proper and improper fractions of polynomials.

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

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

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

1.8 Define a matrix and order of a matrix

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

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

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

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

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

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

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

**UNIT - II**

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

**L.O.** 2.1 Define trigonometric ratios of any angle.

2.2 List the values of trigonometric ratios at specified values.

2.3 Draw graphs of trigonometric functions

2.4 Explain periodicity of trigonometric functions.

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

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

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

2.8 Solve simple problems on compound angles.

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

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

2.11 Solve simple problems using the above formulae

Syllabus for Unit test-I completed

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

2.13 Solve problems by applying these formulae to sum or difference or product of three or more terms.

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

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

2.16 Derive relations between inverse trigonometric functions so that given A= $\sin^{-1}x$, express angle A in terms of other inverse trigonometric functions with examples.

2.17 State various properties of inverse trigonometric functions and identities like $\sin^{-1}x+\cos^{-1}x = \frac{\pi}{2}$ etc.

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

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

2.20 Solve models of the type a $\sin^2 x$ + b sin x +c=0, a cos x + b sin x=c etc., and problems using simple transformations.

2.21 State sine rule, cosine rule, tangent rule and projection rule.

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

2.23 List various formulae for the area of a triangle.

2.24 Solve problems using the above formulae.

2.25 Define Sinh x, cosh x and tanh x and list the hyperbolic identities.

2.26 Represent inverse hyperbolic functions in terms of logarithms.

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

2.28 Define the operations on complex numbers with examples.

2.29 Define amplitude of a complex number

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

2.31 Write DeMoivre's theorem (without proof) and illustrate with simple examples.

## UNIT - III

**Coordinate Geometry**

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

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

3.2 Solve simple problems on the above forms

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

3.4 Define locus of a point and define a circle.

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

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

3.7. Define a conic section.

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

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

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

Syllabus for Unit test-II completed

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

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

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

4.3 Mention 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 the problems using these standard limits.

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

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

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

4.7 Find the derivatives of elementary functions like $x^n$ , $a^x$, $e^x$, log x, sin x, cos x, tanx, Secx,Cosecx and Cot x using the first principles.

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

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

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

4.11 Find the derivatives of Inverse Trigonometric functions and examples using the Trigonometric transformations.

4.12 Explain the method of differentiation of a function with respect to another function and also differentiation of parametric functions with examples.

4.13 Find the derivatives of hyperbolic functions.

4.14 Explain the procedures for finding the derivatives of implicit function with examples.

4.15 Explain the need of taking logarithms for differentiating some functions with examples like $[f(x)]^{g(x)}$.

4.16 Explain the concept of finding the higher order derivatives of second and third order with examples.

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

4.18 Explain the definition of Homogenous function of degree n

4.19 Explain Euler's theorem for homogeneous functions with applications to simple problems.

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

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

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

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

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

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

5.6 Define the concept of increasing and decreasing functions.

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

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

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

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

| Syllabus for Unit test-III completed |
|---|

**C-20**

**ENGINEERING MATHEMATICS – I**

**COMMON TO ALL BRANCHES**

**COURSE CONTENT**

**Unit-I**

**Algebra**

**1. Relations and Functions**:

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

**2. Partial Fractions:**

Define rational, proper and improper fractions of polynomials. Resolve rational fractions in to

their partial fractions covering the types mentioned below.

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

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

**3. Matrices:**

Definition of a matrix, types of matrices-examples, algebra of matrices-equality of two matrices, sum, scalar multiplication and product of matrices. Transpose of a matrix-Symmetric, skew symmetric matrices-Minor, cofactor of an element-

Determinant of a square matrix-Laplace's expansion, properties of determinants. Singular and non singular matrices-Adjoint and multiplicative inverse of a square matrix- examples-System of linear equations in 3 variables-Solutions by Cramers's rule and Matrix inversion method-examples.

## Unit-II

### Trigonometry

**4.Trigonometric ratios:**

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

**5. Compound angles:**

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

**6. Multiple and sub multiple angles:**

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

with problems.

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

**8. Inverse trigonometric functions:**

Definition, domains and ranges-basic properties- problems.

**9. Trigonometric equations:**

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

sinx =k , cosx= k, tanx =k, where k is a constant. Solutions of simple quadratic equations, equations involving usage of transformations- problems.

**10.Properties of triangles:**

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

**11. Hyperbolic functions:**

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

**12. Complex Numbers:**

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

**UNIT-III**

**Coordinate geometry**

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

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

15. Definition of a conic section, equation of a conic when focus directrix and eccentricity are given. properties of parabola, ellipse and hyperbola in standard forms.

**UNIT-IV**

**Differential Calculus**

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

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

## UNIT-V

**Applications of Derivatives:**

18. Geometrical meaning of the derivative, equations of Tangent and normal to a curve at any point. Lengths of tangent, normal, subtangent and subnormal to the curve at any point - problems.

19. Physical applications of the derivative – velocity, acceleration, derivative as a rate measure –Problems.

20. Applications of the derivative to find the extreme values – Increasing and decreasing functions, finding the maxima and minima of simple functions - problems leading to applications of maxima and minima.

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

**Textbook:**

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

**Reference Books:**


1. Shanti Narayan, A Textbook of matrices, S.Chand&Co.
2. Robert E. Moyer & Frank Ayers Jr., Schaum's Outline of Trigonometry, 4th Edition, Schaum's Series
3. M.Vygodsky, Mathematical Handbook, Mir Publishers, Moscow.
4. Frank Ayers & Elliott Mendelson, Schaum's Outline of Calculus, Schaum's Series

**BLUE PRINT**

| S. No | Chapter/ Unit title | No of Periods | | Weightage Allotted | Marks wise distribution of weightage | | | | Question wise distribution of weightage | | | | COs mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Unit - I : Algebra** | **Theory** | **Practice** | | **R** | **U** | **Ap** | **An** | **R** | **U** | **Ap** | **An** | |
| **1** | Relations and Functions | 4 | 2 | 3 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | **CO 1** |
| **2** | Partial Fractions | 3 | 2 | 3 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | **CO 1** |
| **3** | Matrices and Determinants | 10 | 10 | 11 | 3 | 0 | 8 | 0 | 1 | 0 | 1 | 0 | **CO 1** |
| | **Unit - II : Trigonometry** | | | | | | | | | | | | |
| **4** | Trigonometric Ratios | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **CO2** |
| **5** | Compound Angles | 3 | 2 | 3 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | **CO2** |
| **6** | Multiple and Submultiple angles | 4 | 4 | 3 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | **CO2** |
| **7** | Transformations | 3 | 3 | 8 | 0 | 8 | 0 | 0 | 0 | 1 | 0 | 0 | **CO2** |
| **8** | Inverse Trigonometric Functions | 3 | 2 | | | | | | | | | | |
| **9** | Trigonometric Equations | 3 | 2 | 8 | 0 | 0 | 8 | 0 | 0 | 0 | 1 | 0 | **CO2** |
| **10** | Properties of triangles | 3 | 2 | | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **11** | Hyperbolic Functions | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **CO2** |
| **12** | Complex Numbers | 4 | 2 | 3 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | **CO2** |
| | **Unit III : Co-ordinate Geometry** | | | | | | | | | | | | |
| **13** | Straight Lines | 4 | 2 | 3 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | **CO3** |
| **14** | Circle | 3 | 2 | 8 | 0 | 8 | 0 | 0 | 0 | 1 | 0 | 0 | **CO3** |
| **15** | Conic Sections | 8 | 4 | | | | | | | | | | |
| | **Unit – IV : Differential Calculus** | | | | | | | | | | | | |
| **16** | Limits and Continuity | 4 | 2 | 3 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | **CO4** |
| **17** | Differentiation | 17 | 10 | 14 | 3 | 11 | 0 | 0 | 1 | 2 | 0 | 0 | **CO4** |
| | **Unit - V : Applications of Differentiation** | | | | | | | | | | | | |
| **18** | Geometrical Applications | 3 | 2 | 10 | 0 | 0 | 0 | 10 | 0 | 0 | 0 | 1 | **CO5** |
| **19** | Physical Applications | 2 | 2 | | | | | | | | | | |
| **20** | Maxima and Minima | 3 | 4 | | | | | | | | | | |
| **21** | Errors and Approximations | 2 | 1 | | | | | | | | | | |
| **Total** | | **89** | **61** | **80** | **15** | **39** | **16** | **10** | **5** | **8** | **2** | **1** | |

**R: Remembering Type : 15 Marks**

**U: understanding Type : 39 Marks**

**Ap: Application Type : 16 Marks**

**An: Analysing Type : 10 Marks**

## Engineering Mathematics – I

### Unit Test Syllabus

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

## Engineering Physics

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

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

- **Course outcomes**

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

- **Model Blue Print with weightages for Blooms category and questions for chapter and Cos mapped**

| **S. No** | **Unit Title/Chapter** | **No of Periods** | **Weightage of marks** | **Marks wise distribution of weightage** | | | | **Question wise distribution of weightage** | | | | **Mapped with CO** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **R** | **U** | **Ap** | **An** | **R** | **U** | **Ap** | **An** | |
| 1 | Units and Dimensions | 08 | 03 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | CO1 |
| 2 | Elements of Vectors | 12 | 11 | 3 | 8 | 0 | 0 | 1 | 1 | 0 | 0 | CO1 |
| 3 | Dynamics | 12 | 11 | 3 | 8 | 0 | 0 | 1 | 1 | 0 | * | CO2 |
| 4 | Friction | 10 | 11 | 3 | 0 | 8 | 0 | 1 | 0 | 1 | 0 | CO2 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | Work, Power and Energy | 12 | 11 | 3 | 8 | 0 | 0 | 1 | 1 | 0 | 0 | CO3 |
| 6 | Simple harmonic motion | 12 | 11 | 3 | 8 | 0 | 0 | 1 | 1 | 0 | * | CO3 |
| 7 | Heat and Thermodynamics | 12 | 11 | 0 | 8 | 3 | 0 | 0 | 1 | 1 | * | CO4 |
| 8 | Sound | 10 | 11 | 0 | 8 | 3 | 0 | 0 | 1 | 1 | 0 | CO4 |
| 9 | Properties of matter | 10 | 08 | 0 | 8 | 0 | 0 | 0 | 1 | 0 | 0 | CO5 |
| 10 | Electricity and Magnetism | 12 | 14 | 6 | 0 | 8 | 0 | 2 | 0 | 1 | 0 | CO5 |
| 11 | Modern physics | 10 | 08 | 0 | 8 | 0 | 0 | 0 | 1 | 0 | 0 | CO5 |
| **Total** | | **120** | **110** | **24** | **64** | **22** | **0** | **8** | **8** | **4** | ***10** | |

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

**Learning Outcomes**

**1.0 Concept of Units and dimensions**

1.1 Explain the concept of Units , Physical quantity, Fundamental physical quantities and Derived physical quantities

1.2 Define unit, fundamental units and derived units, State SI units with symbols

1.3 State Multiples and submultiples in SI system, State Rules of writing S.I .units, State advantages of SI units

1.4 Define Dimensions, Write Dimensional formulae of physical quantities

1.5 List dimensional constants and dimensionless quantities

1.6 State the principle of Homogeneity of Dimensions

1.7 State the applications and limitations of Dimension alanalysis

1.8 Errors in measurement, Absolute error, relative error, percentage error, significant figures

1.9 Solve problems

**2.0 Concept of Elements of Vectors**

2.1 Explain the concept of scalars, Vectors and give examples

2.2 Represent vectors graphically, Classify the Vectors, Resolve the vectors

2.3 Determine the resultant of a vector by component method, represent a vector in Space using unit vectors (i,j,k)

2.4 State and explain triangle law, parallelogram law, polygon law of addition of vectors

2.5 Define Dot product of two vectors with examples (Work done, Power), Mention the Properties of dot product

2.6 Define cross products of two vectors with examples (Torque, Linear velocity) Mention the properties of Cross product.

2.7 Solve the related numerical problems

**3.0 Concept of Dynamics**

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

3.2 Explain vertical motion of a body and derive expressions for a) Maximum Height, b) time of ascent, c) time of descent, and d) time of flight

3.3 Derive height of at ower when a body projected vertically upwards from the top of a tower.

3.4 Explain projectile motion with examples

3.5 Explain Horizontal projection and Derive an expression for the path of a projectile in horizontal projection

3.6 Explain oblique projection and derive an expression for it. Derive formulae for a) Maximum Height, b) time of ascent, c) time of descent, and d) time of flight e) Horizontal Range, f) Maximum range

3.7 Define force, momentum, angular displacement, angular velocity, angular acceleration, angular momentum, moment of inertia, torque

3.8 Solve the related numerical problems

**4.0 Concept of Friction**

4.1 Define friction and classify the types of friction.

4.2 Explain the concept to f Normal reaction

4.3 State the laws of friction

4.4 Define coefficients of friction, Angle of friction and Angle of repose

4.5 Derive expressions for acceleration of a body on a rough inclined plane (upwards and downwards)

4.6 List the Advantages and Disadvantages of friction

4.7 Mention the methods of minimizing friction

4.8 Explain why it is easy to pull a lawn roller than to push it

4.9 Solve the related numerical problems

**5.0 Concepts of Work, Power, and Energy**

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

5.2 Define potential energy and give examples, derive an expression for P.E

5.3 Define Kinetic energy and give examples, derive an expression for K.E

5.4 State and derive Work-Energy theorem

5.5 Derive the relation between Kinetic energy and momentum

5.6 State the law of conservation of energy and Verify it in the case of a freely Falling body

5.7 Solve the related numerical problems

**6.0 Concepts of Simple harmonic motion**

6.1 Define Simple harmonic motion, Give examples, State the conditions

6.2 Explanation of uniform circular motion of a particle is a combination of

two perpendicular SHMs.

6.3 Derive expressions for displacement, velocity, acceleration, Frequency, Time period of a particle executing SHM.

6.4 Define phase of SHM

6.5 Define Ideal simple pendulum and derive expression for Time period of simple pendulum

6.6 State the laws of motion of simple pendulum

6.7 Solve the related numerical problems

**7.0 Concept of Heat and thermodynamics**

7.1 Explain the concept of expansion of gases

7.2 State and explain Boyle's and Charles laws.

7.3 Define absolute zero temperature, absolute scale of temperature

7.4 Define ideal gas and distinguish from real gas

7.5 Derive Ideal gas equation. Define Specific gas constant and Universal gas Constant, write S.I unit and Dimensional Formula. Calculate the value of R.

7.6 Explain why universal gas constant is same for all gases

7.7 State and Explain Isothermal process and adiabatic process

7.8 State first and second laws of thermodynamics and state applications

7.9 Define specific heats & molar specific heats of a gas, Derive $C_P$-$C_V$ =R

7.10 Solve the relevant numerical problems

**8.0 Concept of Sound**

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

8.2 Distinguish between musical sound and noise

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

8.4 Explain causes, effects and methods of minimizing of noisepollution

8.5 Explain the phenomenon of beats State the applications

8.6 Define Doppler effect, List the Applications

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

8.8 Define and Explain echoes state its applications

8.9 State conditions of good auditorium

8.10 Solve the related numerical problems

**9.0 Concepts of properties of matter**

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

9.2 State and explain Hooke's law

9.3 Definitions of Modulus of elasticity, Young's modulus(Y), Bulk modulus (K), Rigidity modulus ( n),Poisson's ratio ($\sigma$),

9.4 Define surface tension and give examples

9.5 Explain Surface tension with reference to molecular theory

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

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

9.8 Define co-efficient of viscosity and write its units and dimensional formula and State Poiseulle's equation for Co-efficient of viscosity

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

9.10 Solve the related numerical problems

**10.Concepts of Electricity and Magnetism**

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

10.2 Define specific resistance, conductance and state their units

10.3 Explain Kichoff's laws

10.4 Describe Wheat stone's bridge with legible sketch

10.5 Describe Meter Bridge for the determination of resistivity with a circuit diagram

10.6 Explain the concept of magnetism. State the Coulomb's inverse square law of magnetism

10.7 Define magnetic field and magnetic lines of force and write the properties of magnetic lines of force

10.8 Derive an expression for the moment of couple on a bar magnet placed in a uniform magnetic field

10.9 Derive equations for Magnetic induction field strength at a point on the axial line and on the equatorial line of a bar magnet.

10.10 Solve the related numerical problems

**11.0 Concepts of Modern physics**

11.1 State and Explain Photo-electric effect and Write Einstein's photoelectric equation

11.2 State laws of photo electric effect

11.3 Explain the Working of photo electric cell, write its applications.

11.4 Recapitulatere fraction of light and its laws, criticalangle, TotalInternal Reflection

11.5 Explain the principle and working of Optical Fiber, mention different types of Optical Fibre, state the applications

11.6 Define super conductor and superconductivity and mention examples

11.7 State the properties of super conductingmaterials and list the applications

11.8 Nanotechnology definition, non materials, applications

**COURSECONTENT**

**1. Units and Dimensions**:

Introduction – Physical quantity – Fundamental and Derived quantities – Fundamental and Derived units- SI units –Multiples and Sub multiples – Rules for writing S.I. units-Advantages of SI units – Dimensions and Dimensional formulae- Dimensional constants and Dimensionless quantities- Principle of Homogeneity- Advantages and limitations of Dimension alanalysis-Errors in measurement, Absolute error, relative error, percentage error, significant figures-Problems.

**2. Elements of Vectors**:

Scalars and Vectors–Types of vectors(Proper Vector, Null Vector, Unit Vector, Equal, Negative Vector, Like Vectors, Co-Initial Vectors, Co-planar Vectors and

Position Vector).Addition of vectors-Representation of vectors- Resolution of vectors - Parallelogram, Triangle and Polygon laws of vectors–Subtraction of vectors- Dot and Cross products of vectors-Problems

**3. Dynamics**

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

**4. Friction:**

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

**5. Work, Power and Energy:**

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

**6. Simple Harmonic Motion:**

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

**7. Heat and Thermodynamics:**

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

**8. Sound:**

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

9. **Properties of matter**

Definition of Elasticity –Definition of stress and strain -the units and dimensional formulae for stress and strain-The Hooke's law- Definitions of Modulus of elasticity, Young's modulus(Y), Bulk modulus(K), Rigidity modulus ( n),Poisson's ratio ($\sigma$), relation between Y, K, n and $\sigma$(equations only no derivation)

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

**10. Electricity & Magnetism:**

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

**11. Modern Physics;**

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

**REFERENCEBOOKS**


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

- **Table specifying the scope of syllabus to be covered for Unit Tests**

| **Unit Test** | **Learning outcomes to be covered** |
|---|---|
| Unit Test – 1 | **From 1.1 to 4.9** |
| Unit Test – 2 | **From 5.1 to 8.10** |
| Unit Test – 3 | **From 9.1 to 11.8** |

## Engineering Chemistry and Environmental Studies

| Course code | Course Title | No. of Periods per week | Total No. of Periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-104 | Engineering Chemistry and Environmental Studies | 4 | 120 | 20 | 80 |

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

- **Course outcomes**

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

- **Model Blue Print with weightages for Blooms category and questions for each chapter and COs mapped**

| **S.No** | **Unit Title/Chapter** | **No of Periods** | **Weight age of marks** | **Marks wise distribution of Weightage** | | | | **Question wise distribution of Weightage** | | | | **Mapped with CO** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **R** | **U** | **Ap** | **An** | **R** | **U** | **Ap** | **An** | |
| 1 | Fundamentals of Chemistry | 18 | 19 | 8 | 8 | 3 | | 1 | 1 | 1 | | CO1 |
| 2 | Solutions | 10 | 11 | 0 | 0 | 8 | 3 | | | 1 | 1 | CO1 |
| 3 | Acids and bases | 10 | 11 | 0 | 8 | 0 | 3 | | 1 | | 1 | CO1 |
| 4 | Principles of Metallurgy | 8 | 8 | 8 | 0 | 0 | | 1 | | | | CO1 |
| 5 | Electrochemistry | 16 | 11 | 8 | 3 | 0 | | 1 | 1 | | * | CO2 |
| 6 | Corrosion | 8 | 8 | 0 | 8 | 0 | | | 1 | | | CO2 |
| 7 | Water Treatment | 10 | 11 | 8 | 3 | 0 | | 1 | 1 | | | CO3 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Polymers | 12 | 11 | 3 | 8 | 0 | | 1 | 1 | | * | CO4 |
| 9 | Fuels | 6 | 3 | 3 | 0 | 0 | | 1 | | | | CO4 |
| 10 | Chemistry in daily life | 6 | 3 | 0 | 0 | 3 | | | | 1 | | CO4 |
| 11 | Environmental Studies | 16 | 14 | 3 | 11 | 0 | | 1 | 2 | | | CO5 |
| Total | | 120 | 110 | 12 | 6 | 6 | 6 | 20 | 35 | 5 | *10 | |

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

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

**ENGINEERINGCHEMISTRY AND ENVIRONMENTAL STUDIES**

**1.0 Atomic structure**

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

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

1.3 Explain the significance of four Quantum numbers.

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

1.5 Define Orbital of an atom , draw the shapes of s,pandd- Orbitals and draw the shapes of s ,p and d-Orbitals.

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

1.7 Explain the significance of chemical bonding

1.8 Explain the Postulates of Electronic theory of valency.

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

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

1.11 Structures of ionic solids-define a) Unit cell b) co-ordination number and the structures of NaCl and CsCl unit cells.

## 2.0 Solutions

2.1 Define the terms 1.Solution, 2.Soluteand 3.Solvent

2.2 Classify solutions based on physical state and solubility

2.3 Define mole and problems on mole concept.

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

2.5 Define molarity and normality and numerical problems on molarity and normality

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

b) Calculate the weight of solute if Molarity or normality with volume of solution are given

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

## 3.0 Acids and bases

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

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

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

3.4 Explain the Ionic product of water

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

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

3.7 State the application of buffer solutions

## 4.0 Principles of Metallurgy

4.1 List out the Characteristics of Metals and non-metals

4.2 Distinguish between Metals and Non-metals

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

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

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

4.6 Explain the purification of Copper by Electrolytic Refining

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

1. Brass 2. Germen silver 3. Nichrome.

**5.0 Electrochemistry**

5.1 Define the terms 1. Conductor

2. Semiconductor

3. Insulator

4. Electrolyte

5. Non–electrolyte. Give two examples each.

5.2 Distinguish between metallic conduction and Electrolytic conduction

5.3 Explain electrolysis by taking example used NaCl

5.4 Explain Faraday's laws of electrolysis

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

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

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

5.8 Distinguish between electrolytic cell and galvanic cell

5.9 Explain the electrode potentials and standard electrode potentials

5.10 Explain the electro chemical series and its significance

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

**6.0 Corrosion**

6.1 Define the term corrosion.

6.2 state the Factor sin fluencing the rate of corrosion

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

6.4 Define rusting of iron and explain theme chanism of rusting of iron.

6.5 Explain the methods of prevention of corrosion

a) Protective coatings (anodic and cathodic coatings)

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

**7. 0 Water Treatment**

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

7.2 Define and Classify the hardness of water.

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

7.4 State the disadvantages of using hard water in industries.

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

7.6 Explain the method so f softening of hard water: a) Ion-exchange process,

b) Permuted process or zeolite process

7.7 State the essential qualities of drinking water.

7.8 Chemistry involved in treatment of water (Coagulation, Chlorination, deflouridation)

7.9 Explain Osmosis and Reverse Osmosis with examples.

7.10 State the applications of Reverse Osmosis.

**8.0 Polymers**

8.1 Explain the concept of polymerization

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

8.3 Define the term plastic and classify the plastics with examples.

8.4 Distinguish between thermo plastics and the rmo setting plastics

8.5 List the Characteristics of plastics and state the disadvantages of using plastics.

8.6 State the advantages of plastics over traditional materials.

8.7 Explain the methods of preparation and uses of the following plastics:

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

8.8 Explain processing of Natural rubber and write the structural formula of Natural rubber.

8.9 List the Characteristics of raw rubber

8.10 Define and explain Vulcanization and List out the Characteristics of Vulcanized rubber.

8.11 Define the term Elastomer and describe the preparation and uses of the following synthetic rubbers a) Buna-s and b)Neoprene rubber.

**9.0 Fuels**

9.1 Define the term fuel

9.2 Classify the fuels based on physical state and based on occurrence.

9.3 List the characteristics of good fuel.

9.4 State the composition and uses of gaseous fuels.

a)water gas b)producer gas, c)natural gas, d) Coal gas, e)Biogas.

**10.0 Chemistry in daily life**

10. Give the basic chemical composition, applications, health aspects and pollution impacts of

a) soaps, and detergents

b)vinegar

c) Insect repellent sand

d) activated charcoal

e) Soft drinks

**11.0 ENVIRONMENTALSTUDIES**

11.1 Define the term environment and explain the scope and importance of environmental studies

11.2 Define the segments of environment 1).Lithosphere, 2).Hydrosphere, 3).Atmosphere, 4).Biosphere,

11.3 Define the following terms 1)Pollutant, 2).Pollution, 3).Contaminant, 4)receptor, 5)sink, 6) particulates, 7)dissolved oxygen (DO), 8)Threshold limit value (TLV), 9).BOD,10).COD 11) eco system12)Producers13)Consumers 14) Decomposers with examples

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

11.5 Explain biodiversity and threats to biodiversity

11.6 Define air pollution and classify the air pollutants-based on origin and physical state of matter.

11.7 Explain the causes, effects of air pollution on human beings, plants and animals and control methods of air pollution.

11.8 State the uses of forest resources.

11.9 State the deforestation and its causes and effects.

11.10 Explain the 1.) Green house effect , 2) Ozone layer depletion and 3) Acidrain

11.11 Define Water pollution, explain the causes, effects and control methods of Water pollution.

**COURSE CONTENT**

**ENGINEERING CHEMISTRY AND ENVIRONMENTAL STUDIES**

**1. Fundamentals of Chemistry**

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

**Chemical Bonding:** Introduction – types of chemical bonds – Ionic and covalentbond with examples–Properties of Ionic and Covalent compounds-structures of ionic crystals (NaCl and CsCl).

**2. Solutions**

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

### 3. Acids and Bases

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

### 4. Principles of Metallurgy

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

### 5. Electrochemistry

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

### 6. Corrosion

Introduction - factors influencing corrosion - composition, stress and concentration cells–rusting of iron and its mechanism – prevention of corrosion by coating methods, cathodic protection methods.

### 7. Water technology

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

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

### 8. Polymers

Introduction – polymerization – types of polymerization – addition, condensation with examples – plastics – types of plastics – advantages of plastics over traditional materials-Disadvantages of using plastics – Preparation and uses of the following plastics i).PVC ii) Teflon iii) Polystyrene

iv) Nylonn 6,6 –Processing of natural rubber - Vulcanization – Elastomers-Preparation and applications of Buna-s, Neoprene rubbers.

**9. Fuels**

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

**10. Chemistry in daily life**

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

**11. ENVIRONMENTALSTUDIES**

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

**Table specifying the scope of syllabus to be covered for unit test 1, unit test 2 and unit test 3**

| **Unit Test** | **Learning outcomes to be covered** |
|---|---|
| Unit Test - 1 | **From 1.1 to 4.7** |
| Unit Test - 2 | **From 5.1 to 8.11** |
| Unit Test - 3 | **From 9.1 to 11.11** |

**REFERENCEBOOKS**


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


- **Model question paper for Unit Test with Cos mapped**

## Basics Of Computer Engineering

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-105 | **Basics Of Computer Engineering** | 3 | 90 | 20 | 80 |

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

| | | | |
|---|---|---|---|
| **Course Outcomes** | Upon completion of the course the student shall be able to | | |
| | CO1 | CM-105.1 | Explain computer fundamentals |
| | CO2 | CM-105.2 | Explain various flowchart, algorithm methods |
| | CO3 | CM-105.3 | Explain the importance of Basic Computer operating systems |
| | CO4 | CM-105.4 | Analyse functioning of various Hardware components |
| | CO5 | CM-105.5 | Explain Networking process in computers |
| | CO6 | CM-105.6 | Explain basics of emerging technologies in the world |

**Learning Outcomes:**

**1.0 Fundamentals of Digital Computer**

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

**2.0 Implement Programming Methodology.**

2.1. State the different steps involved in problem solving.
2.2. Define algorithm.
2.3. List four characteristics of algorithm.
2.4. Define a program
2.5. Differentiate between program and algorithm.

2.6. State the steps involved in algorithm development.
2.7. Differentiate between algorithm and flowchart.
2.8. Develop algorithms for simple problems.
2.9. Draw the symbols used in flowcharts.
2.10. Draw flowcharts for simple problems.

**3.0 Operating Systems basics**

3.1. Describe the need for an operating system.
3.2. List the various operating systems used presently.
3.3. List and explain
  3.3.1. Types of dos commands
  3.3.2. Any 10 Internal Commands
  3.3.3. Any 5 External Commands
  3.3.4. Features of Windows desktop.
  3.3.5. Components of a Window.
3.4. State the function of each component of a Window.
3.5. Describe the Method of starting a program using start button
3.6. Explain usage of maximize, minimize, restore down and close buttons.
3.7. State the meaning of a file ,folder.
3.8. Describe the Method of viewing the contents of hard disk drive using Explorer
3.9. Describe the Method of finding a file using search option.
3.10. Use control panel for
  3.10.1. installing and uninstalling software
  3.10.2. installing and uninstalling hardware
  3.10.3. Changing the system date and time
  3.10.4. Installing a printer
3.11. ExplainDrive space using system tool option of Accessories group
3.12. Explain Disk defragmentation using System tools
3.13. Explain the procedure for changing resolution, color, appearance, screensaver options of the display

**4.0 Computer Hardware and Networking Basics**

4.1 Hardware Basics

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

4.1.2 Software - 3 types of Software:ROM BIOS, OS, application software
4.1.3 Explain Functions of BIOS
4.1.4 Explain boot process
4.1.5 Explain POST and important beep codes
4.1.6 Describe about different connectors.

4.2 Networking Basics

4.1.1. Explain meaning of a computer network.
4.1.2. Describe the concept of a Local Area Network,Wide Area Network
4.1.3. Compare Internet and Intranet
4.1.4. Describe about internet service provider.
4.1.5. Explain the role of a modem in accessing the Internet.
4.1.6. Describe address format and IP address
4.1.7. What is browser and List various browsers
4.1.8. Explain the role of search engines with examples.
4.1.9. Explain Internet Security.

**5.0 Emerging Trends in Computer Technology**

5.1. Introduction to Machine Learning

5.1.1. Define Machine Learning, Compare Traditional Programming with Machine Learning

5.1.2. List the applications and key elements of Machine Learning

5.1.3. Define the terms in relation to approaches to Machine Learning(Decision tree learning, Association rule learning, Artificial neural networks, Deep Learning, Inductive Learning, Genetic algorithms, Clustering)

5.1.4. Explain Inductive Learning

5.1.5. Classify the Machine Learning

5.2. Introduction to Big data

5.2.1. Define and list sources of Big data

5.2.2. Evolution of data/big data

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

5.2.4. Describe Storing and selecting of Big Data

5.2.5. State the Need of Big Data

5.2.6. List types of tools used in Big Data

5.2.7. List applications of big data

5.3. Basics of Ethical Hacking

5.3.1. Define Ethical Hacking and List the categories of Hackers

5.3.2. Describe Roles and responsibilities of Ethical Hackers

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

5.4. Virtual Reality concepts

5.4.1. Define the terms Virtual Reality, Telepresence, Cyberspace, Telexistence, HCI (Human-Computer Interaction), Haptics, Hapticstechnologies,augmented reality and mixed reality

5.4.2. Discuss the evolution of Virtual Reality

**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**

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

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

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

Virtual Reality concepts- Virtual Reality, Telepresence, Cyberspace, Telexistence, HCI ,Haptics, Hapticstechnologies, Discuss the evolution of Virtual Reality

**REFERENCE BOOKS**

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

**Model Blue Print:**

| S.No. | Chapter/Unit title | No.of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Fundamentals of Digital Computers | 15 | 14 | 3 | 11 | | | 1 | 2 | | | CO1,CO3,CO4 |
| 2 | Programming Methodologies | 10 | 14 | 3 | 3 | 8 | * | 1 | 1 | 1 | * | CO2 |
| 3 | Operating system basics | 20 | 14 | 3 | 3 | 8 | | 1 | 1 | 1 | | CO1,CO3 |
| 4 | Computer Hardware and Networking Basics | 25 | 14 | 3 | 11 | | * | 1 | 2 | | * | CO1,CO4, CO5 |
| 5 | Emerging Computer Technologies | 20 | 14 | 6 | 8 | | | 2 | 1 | | | CO2,CO6 |
| | **Total** | **90** | **70 + (10*)** | **18** | **36** | **16** | **10*** | **6** | **7** | **2** | **1** | |

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

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

| Unit Test | Learning outcomes to be covered |
|---|---|
| Unit test-1 | From 1.1 to 3.3 |
| Unit test-2 | From 3.4 to 4.1 |
| Unit test-3 | From 4.2 to 5.4 |

## Programming in C

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

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

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

**Learning Objectives**

**1.0 Introduction to C-Language**

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

**1.2** Describe the programming style of C language

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

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

**1.5** Define Data Type

**1.6** Classify Data Types and explain them with examples.
**1.7** Explain declaration of constants and variables
**1.8** Explain initializing values to variables in declaration
**1.9** Explain about user defined data types with a simple program
**1.10** Explain the usage of type qualifiers

**2.0 Input and output statements, Operators and Expressions in C**
**2.1** Explain the importance of Pre-processor Directive #include
**2.2** Illustrate
- **2.2.1** Reading a character using getch(), getche() and getchar()
- **2.2.2** writing a character using putch(), putchar()
- **2.2.3** Formatted input using scanf() & write sample programs using it.
- **2.2.4** Formatted output using printf()& write sample programs using it.

**2.3** Explain character functions
**2.4** Define an operator, an expression
**2.5** Explain
- **2.5.1** Various arithmetic operators and explain the evaluation of arithmetic expressions with example.
- **2.5.2** Various relational operators and discuss evaluation of relational expressions
- **2.5.3** Various logical operators and discuss evaluation of logical expressions

**2.6** Explain the difference between unary and binary operators
**2.7** Describe various assignment operators, increment and decrement operators
**2.8** Illustrate nested assignment
**2.9** Explain conditional operators with an example
**2.10** Explain
- **2.10.1** Bit-wise operators and explain each with an example
- **2.10.2** Special operators with examples
- **2.10.3** Precedence and Associativity of operators

**2.11** Describe evaluation of compound expression
**2.12** Illustrate type conversion techniques
**2.13** Write sample programs by using all the operators

**3.0 Decision making, iterative and other control statements**
**3.1** Explain decision making statements and its need in programming
**3.2** Explain
- **3.2.1** Simple if and if-else statement with syntax and sample program
- **3.2.2** Nested if..else statements with syntax and sample program
- **3.2.3** if-else-if ladder with syntax and sample program
- **3.2.4** switch statement with syntax and sample program

**3.3** State the importance of break statement with switch and illustrate
**3.4** Compare
- **3.4.1** Conditional operator with if-else statement
- **3.4.2** if-else with switch statement

**3.5** Define looping or iteration
**3.6** List and explain iterative statements with syntax and examples
**3.7** Compare different loop statements
**3.8** What is nested loop and illustrate.
**3.9** Explain the usage of goto, break and continue statements with loop statements

**3.10** Differentiate break and continue statements.
**3.11** Define structured programming.
**4.0 Arrays, strings, Structures and Unions**
**4.1** Define Array
**4.2** Describe
**4.2.1** Declaration and initialization of One Dimensional (1D) Array with syntax and sample programs.
**4.2.2** Accessing the elements in 1D-Array with sample programs.
**4.2.3** Reordering an array in ascending order.
**4.3** Explain declaration and initialization and usage of two Dimensional (2D)Arrays.
**4.4** Illustrate the concept of arrays with sample programs on matrix addition, subtraction and matrix multiplication
**4.5** Define String
**4.6** Describe
**4.6.1** Declare and initialize of String variables.
**4.6.2** gets() and puts()
**4.6.3** Reading and displaying of strings from terminal with sample programs.
**4.6.4** Explain about various String handling functions with sample programs.
**4.7** Explain Character arithmetic.
**4.8** Define a structure.
**4.9** Explain
**4.10** Initializing structure, Declaring structure, Declaring Structure Variables.
**4.11** Accessing of the structure members
**4.12** Structure assignment.
**4.13** How to find size of a structure.
**4.14** Nested structure concept.
**4.15** Structures containing arrays
**4.16** Array of structures
**4.17** Define Union, declare, initialize and use of union.
**4.18** Distinguish between Structures and Unions
**4.19** Write sample programs for all the concepts of structures and unions
**5.0 User defined functions, pointers, file management and preprocessor directives**
**5.1** Explain
**5.1.1** Need of user defined functions
**5.1.2** Advantages of the functions
**5.1.3** Elements of function
**5.1.4** Return values and their types
**5.2** Define a function call, function prototype
**5.3** Explain
**5.3.1** Function declaration in programs
**5.3.2** Functions with no arguments and no return values with sample programs
**5.3.3** Functions with arguments with no return values with sample programs
**5.3.4** Functions with arguments with return values with sample programs
**5.3.5** Functions with no arguments with return values with

sample programs

**5.3.6** Functions that return multiple values with sample programs

**5.3.7** Recursion with sample programs

**5.3.8** Passing arrays to functions with sample programs

**5.3.9** Structure as function arguments and structures as function values.

**5.3.10** Structures containing pointers.

**5.3.11** Self referential structures with examples.

**5.3.12** Storage classes-auto, register, static, extern

**5.3.13** Scope, visibility and lifetime of variables in functions

**5.4** Differentiate Local and External variables

**5.5** Define Global variable

**5.6** Discuss passing the global variables as parameters using sample programs

**5.7** Explain

**5.7.1** Declaration and initialization of Pointers.

**5.7.2** Accessing the address of a variable using &operator

**5.7.3** Accessing the value of a variable through pointer

**5.7.4** Pointer Arithmetic

**5.7.5** Precedence of address and de-referencing operators.

**5.7.6** Relationship between arrays and pointers.

**5.7.7** Accessing array elements using pointers

**5.7.8** Pointers as function arguments

**5.7.9** Pointer arrays with examples.

**5.8** Differentiate between address and de-referencing operators.

**5.9** Explain

**5.9.1** Dynamic memory management functions with examples.

**5.9.2** Structures containing pointers.

**5.9.3** Pointer to structure.

**5.9.4** Self referential structures with examples.

**5.10** Explain

**5.10.1** Files and how to declare file pointer to afile

**5.10.2** Illustrate the concept of file opening using various modes

**5.10.3** Illustrate the concept of closing of a file

**5.10.4** Illustrate the concept of Input / Output operations on a file

**5.10.5** Illustrate the concept of random accessing files

**5.10.6** Explain different file handling functions

**5.10.7** Explain Pre-processor directives

**5.10.8** State Need of pre-processor directives.

**5.11** Write Simple programs using pre-processor directives.

**5.12** Simple program using command line arguments(argc and argv)

**COURSE CONTENT**

1. **Introduction to C Language**: History of C language - importance of C Define language - structure of C language - programming style of C language - steps involved in executing the C program-Character set - C Tokens - Keywords and Identifiers- Constants and Variables - Data Types and classification - declaration of constants and variables-initializing values to variables-user defined data types-usage of type qualifiers.

2. **Input and output statements, Operators and Expressions in C :**importance of Pre-processor #include-reading and writing a single character functions- formatted input and output statements-operators-classification of operators-operator precedence and associativity- expressions and expression evaluation-type conversion techniques.
3. **Understand Decision making, iterative and other control statements :**simple if, if-else, if else ladder, nested if-else-switch statement - else if, nested if , else if ladder, switch statements- Classification of various loop statements- while statement – do.. while statement ram - for loop statement - nesting of loops- Comparisons of different loop statements –goto statement- break and continue statements –concept of structured programming
4. **Understand Arrays and strings , basics of Structures and Unions:** Arrays -One Dimensional Arrays – array programs -two Dimensional Arrays- programs on matrix - Strings –- String handling functions - Structure- Array of structures - Nested structures- pointer to structure Self referential structures - Union and illustrate use of a union – difference between Structures and Union
5. **Understand User defined functions, basics of pointers, file management and pre-processor directives:** Function – user defined functions – Advantages - Recursion concept - parameter passing –storage classes - scope, visibility and lifetime of variables in functions- Local and External variables -Global variable- - Pointer - Differentiate address and de-referencing operators - Pointer Arithmetic- precedence of address and de- referencing operators - -Relationship between Arrays and Pointers - Pointers as Function Arguments - Dynamic memory management-
6. Files - file pointers - file opening in various modes - Concept of closing of a file –operations on files - Need of Pre-processor directives - Various Pre-processor directives- Macros – Command line arguments

**REFERENCE BOOKS**


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

**Model Blue Print**

| S.No. | Chapter/Unit title | No.of periods | Weightage Allocatd | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Introduction to C Language | 20 | 14 | 6 | 8 | | | 2 | 1 | | | CO1,CO2 |
| 2 | Input and output statements, Operators and Expressions in C | 25 | 14 | | 6 | 8 | * | | 2 | 1 | * | CO1,CO2,C3 |
| 3 | Decision making, iterative and other control statements | 40 | 14 | | 6 | 8 | * | | 2 | 1 | * | CO1,CO2,CO3 |
| 4 | Arrays and strings, Structures and Unions | 30 | 14 | 3 | 3 | 8 | * | 1 | 1 | 1 | * | CO1,CO2,CO3 |
| 5 | User defined functions, pointers, file management and pre-processor directives | 35 | 14 | 3 | 3 | 8 | * | 1 | 1 | 1 | * | CO1,CO2,CO3, CO4,CO5 |
| | **Total *** | **150** | **70 +10(*)** | **12** | **26** | **32** | **10*** | **4** | **7** | **4** | **1** | CO1,CO2,CO3, CO4 |

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

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

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

## ENGINEERING DRAWING

**Subject Title : Engineering Drawing**
**Subject Code : CM–107**
**Periods/Week : 06**
**Periods Per Year : 180**

**TIME SCHEDULE**

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

**Course Outcomes**

| | | | |
|---|---|---|---|
| **Course Outcomes** | **CO1** | CM-107.1 | Practice the use of engineering drawing instruments |
| | **CO2** | CM-107.2 | Familiarise with the conventions to be followed in engineering drawing as per BIS |
| | **CO3** | CM -107.3 | Construct the i) basic geometrical constructions ii) engineering curves |
| | **CO4** | CM -107.4 | Visualise and draw the orthographic projections of i) Points ii) Lines<br>iii) Regular Planes iv) Regular Solids V) Sections of Regular Solids |
| | **CO5** | CM -107.5 | Visualise and draw the isometric views of machine components |
| | **CO6** | CM -107.6 | Draw the developments of surfaces of regular solids and use them to make the components used in daily life |

**LEARNING OUTCOMES**

Upon completion of the course the student shall able to

***1.0*** **Understand the basic concepts of Engineering Drawing**

1.1 State the importance of drawing as an engineering communication medium

1.2 State the necessity of B.I.S. Code of practice for Engineering Drawing.

1.3 Explain the linkages between Engineering drawing and other subjects of Mechanical Engineering.

**2.0 Use of Engineering Drawing Instruments**

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

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

2.3 Select and use appropriate scales for a given application.

2.4 Identify different drawing sheet sizes as per I.S. and Standard Lay- outs.

2.5 Prepare Title block as per B.I.S. Specifications.

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

Drawing Plate 1: (Having two exercises)

**3.0 Write Free Hand Lettering and Numbers**

3.1 Write titles using vertical lettering and numerals of 7mm, 10mm and 14mm height.

3.2 Write titles using sloping lettering and numerals of 7mm, 10mm and 14mm height.

3.3 Select suitable sizes of lettering for different layouts and applications.

Drawing plate 2: (Having 5 to 6 exercises)

**4.0 Understand Dimensioning Practice**

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

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

Drawing Plate 3: (Having 08 to10 exercises)

**5.0 Apply Principles of Geometric Constructions**

5.1 Practice the basic geometric constructions like i) dividing a line into equal parts ii) exterior and interior tangents to the given two circles iii) tangent arcs to two given lines and arcs

5.2 Draw any regular polygon using general method when i) side length is given ii) inscribing circle radius is given iii) describing circle radius is given

5.2 Draw the conics using general and special methods,

5.3 Draw the engineering curves like i) involute ii) cycloid iii) helix

5.4 Identify the applications of the above constructions in engineering practice.

Drawing Plate -4: Having problems up to construction of polygon

Drawing Plate -5: Having problems of construction of conics

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

**6.0 Projections of points, lines, planes & auxiliary planes**

6.1 Explain the basic principles of the orthographic projections

6.2 Visualise and draw the projection of a point with respect to reference planes (HP&VP)

6.3 Visualise and draw the projections of straight lines with respect to two reference Planes (up to lines parallel to one plane and inclined to other plane)

6.4 Visualise and draw the projections of planes (up to planes perpendicular to one plane and inclined to other plane)

6.5 Identify the need of Auxiliary views for a given engineering drawing.

6.5 Draw the auxiliary views of a given engineering component .

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

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

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

**7.0 Draw the Projections of Solids**

7.1 Visualise and draw the projections of regular solids like Prisms, Pyramids, Cylinder, Cone...(up to axis of solids parallel to one plane and inclined to other plane) Drawing plate No.10: Having problems of projection of solids (10 exercises)

**8.0 Appreciate the need of Sectional Views**

8.1 Identify the need to draw sectional views.

8.2 Differentiate between true shape and apparent shape of section

8.3 Draw sectional views and true sections of regular solids by applying the principles of hatching.

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

**9.0 Apply principles of orthographic projection**

9.1 Draw the orthographic views of an object from its pictorial drawing.

9.2 Draw the minimum number of views needed to represent a given object fully.

Drawing Plate 12 : (Having 10 to 12 exercises)

**10.0 Prepare pictorial drawings**

10.1 identify the need of pictorial drawings.

10.2 Differentiate between isometric scale and true scale.

10.3 Prepare Isometric views from the given orthographic drawings.

Drawing plate 13: (Having 10 to 12 exercises)

**11.0 Interpret Development of surfaces of different solids**

11.1 State the need for preparing development drawing.

11.2 Draw the development of simple engineering objects and their truncations (cubes, prisms, cylinders, cones, pyramid)

11.3 Prepare development of surface of engineering components like

i) funnel ii) $90^0$ elbow iii) Tray

Drawing plate No. 14: (Having 05 exercises)

**Competencies and Key competencies to be achieved by the student**

| S.No | Major topic | Key Competency |
|---|---|---|
| 1. | Importance of Engineering Drawing | • Explain the linkages between Engineering drawing and other subjects of study in Diploma course. |
| 2. | Engineering Drawing Instruments | • Select the correct instruments to draw various entities in different orientation |
| 3. | Free hand lettering & Numbering | • Write titles using sloping and vertical lettering and numerals as per B.I.S (Bureau of Indian standards) |
| 4. | Dimensioning Practice | • Dimension a given drawing using standard notations and desired system of dimensioning |

| | | |
|---|---|---|
| 5. | Geometrical construction | • Construct ellipse, parabola, rectangular hyperbola, involute, cycloid and helix from the given data. |
| 6. | Projection of points, Lines, Planes & Solids | • Draw the projections of points, straight lines, planes & solids with respect to reference planes (HP& VP) |
| 7. | Auxiliary views | • Draw the auxiliary views of a given Engineering component<br>• Differentiate between Auxiliary view and apparent view |
| 8. | Sections of Solids | • Differentiate between true shape and apparent shape of section<br>• Apply principles of hatching.<br>• Draw simple sections of regular solids |
| 9. | Orthographic Projection | • Draw the minimum number of views needed to represent a given object fully. |
| 10. | Isometric Views | • Differentiate between isometric scale and true scale.<br>• Draw the isometric views of given objects,. |
| 11. | Development of surfaces | • Prepare development of Surface of regular solids and other components like i) funnel<br>ii) $90^0$ elbow iii) Tray |

**COURSE CONTENTS:**

***NOTES:***

1. **B.I.S Specification should invariably be followed in all the topics.**
2. **A-3 Size Drawing Sheets are to be used for all Drawing Practice Exercises.**

**1.0 The importance of Engineering Drawing**

Explanation of the scope and objectives of the subject of Engineering Drawing Its importance as a graphic communication -Need for preparing drawing as per standards – SP-46 –1988 – Mention B.I.S - Role of drawing in -engineering education – Link between Engineering drawing and other subjects of study.

**2.0 Engineering drawing Instruments**

Classifications: Basic Tools, tools for drawing straight lines, tools for curved lines, tools for measuring distances and special tools like mini drafter & drafting machine – Mentioning of names under each classification and their brief description -Scales: Recommended scales reduced & enlarged -Lines: Types of lines, selection of line thickness - Selection of Pencils -Sheet Sizes: A0, A1, A2, A3, A4, A5, Layout of drawing sheets in respect of A0, A1, A3 sizes, Sizes of the Title block and its contents - Care and maintenance of Drawing Sheet,

**3.0 Free hand lettering & numbering**

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

**4.0 Dimensioning practice**

Purpose of engineering Drawing, Need of B.I.S code in dimensioning -Shape description of an Engineering object -Definition of Dimensioning size description -Location of features, surface finish, fully dimensioned Drawing -Notations or tools of dimensioning, dimension line extension line, leader line, arrows, symbols, number and notes, rules to be observed in the use of above tools -Placing dimensions: Aligned system and unidirectional system ( SP-46-1988)-Arrangement of dimensions Chain, parallel, combined progressive, and dimensioning by co-ordinate methods-The rules for dimensioning standard, features “Circles (holes) arcs, angles, tapers, chamfers, and dimension of narrow spaces.

**5.0 Geometric Construction**

**Division of a line**: to divide a straight line into given number of equal parts
**Construction of tangent lines**: to draw interior and exterior tangents to two circles of given radii and centre distance
**Construction of tangent arcs:**
i) To draw tangent arc of given radius to touch two lines inclined at given angle (acute, right and obtuse angles).
ii)Tangent arc of given radius touching a circle or an arc and a given line.
iii)Tangent arcs of radius R, touching two given circles internally and externally.

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

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

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

**6.0 Projection of points, lines and planes & auxiliary views**

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

**Projections of points in different quadrants**

**Projections of straight line -**

(a) Parallel to both the planes.
(b) Perpendicular to one of the planes.
(c) Inclined to one plane and parallel to other planes

**Projections of regular planes**

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

**Auxiliary views**

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

**7.0 Projections of regular solids**

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

**8.0 Sections of Solids**

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

**9.0 Orthographic Projections**

Meaning of orthographic projection - Using a viewing box and a model – Number of views obtained on the six faces of the box, - Legible sketches of only 3 views for describing object -Concept of front view, top view, and side view sketching these views for a number of engg objects - Explanation of first angle projection. –

Positioning of three views in First angle projection - Projection of points as a means of locating the corners of the surfaces of an object – Use of miter line in drawing a third view when other two views are given -Method of representing hidden lines -Selection of minimum number of views to describe an object fully.

## 10.0 Pictorial Drawings

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

## 11.0 Development of Surfaces

Need for preparing development of surface with reference to sheet metal work-Concept of true length of a line with reference to its orthographic projection when the line is (i) parallel to the plane of projection (ii) inclined to one principal and parallel to the other -Development of simple solids like cubes, prisms, cylinders, cones, pyramid and truncation of these solids-Types of development: Parallel line and radial line development -Procedure of drawing development of funnels, $90^0$ elbow pipes, Tray.

**REFERENCE BOOKS**

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

## Programming in C Lab

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

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

| Course Outcomes | | Upon completion of the course the student shall be able to |
|---|---|---|
| CO 1 | CM-108.1 | Perform Edit, compile and debug and execution of C-Programs |
| CO 2 | CM-108.2 | Develop programs using different predefined functions, keywords, user defined identifiers |
| CO 3 | CM-108.3 | Write different expressions using available C-operators and valid data supported by C-language |
| CO 4 | CM-108.4 | Develop C-programs using control statements, array's, structures, unions, files |
| CO 5 | CM-108.5 | Develop C-programs using user defined functions and recursion |
| CO 6 | CM-108.6 | Develop C-programs to implement dynamic memory concept |

**LEARNING OUTCOMES:**

**Fundamentals and Input / Output statements**

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

**Control statements**

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

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

**Arrays, structures and unions**

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

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

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

**The competencies and key competencies to be achieved by the student**

| S. No. | Name of the experiment | Objectives | Key Competencies |
|---|---|---|---|
| 1 | Exercise on structure of C program | For a given C program, identify the different building blocks | ❖ Identify different building block in a C program |
| 2 | Exercise on Keywords and identifiers | For a given C program identify the keywords and identifiers | ❖ Identify different keywords<br>❖ Check whether the keywords are in lowercase<br>❖ Differentiate identifiers and keywords |
| 3 | Exercise on constants and variables | For a given C program identify the constants and variables | ❖ Identify the constants<br>❖ Identify the variables<br>❖ Declare variables with proper names<br>❖ Know the assignment of values to variables |
| 4 | Execution of simple C program | Execute a simple C program | ❖ Acquaint with C program editing<br>❖ Compile the program<br>❖ Rectify the syntactical errors<br>❖ Execute the program |
| 5 | Exercise on operators and expressions | Write a C program that uses different arithmetic operators | ❖ Identify different arithmetic operators<br>❖ Build arithmetic expressions<br>❖ Identify the priorities of operators<br>❖ Evaluate arithmetic expression<br>❖ Compile the program<br>❖ Rectify the syntactical errors |

| | | | |
|---|---|---|---|
| | | | ❖ Execute the program<br>❖ Check the output for its correctness |
| 6 | Exercise on special operators | Write a C program that uses special operators | ❖ Identify different special operators<br>❖ Build expressions using special operators<br>❖ Compile the program<br>❖ Rectify the syntactical errors<br>❖ Execute the program<br>❖ Check the output for its correctness |
| 7 | Exercise on input and output of characters | Write a C program for reading and writing characters | ❖ Know the use of get char() function<br>❖ Know the use of put char() function<br>❖ Compile the program<br>❖ Rectify the syntactical errors<br>❖ Execute the program<br>❖ Check whether the correct output is printed for the given input |
| 8 | Exercise on formatted input and output | Write a C program using formatted input and formatted output | ❖ Know the use of format string for different types of data in scan f() function<br>❖ Know the use of format string for different types of data in print f() function<br>❖ Check whether the data is read in correct format<br>❖ Check whether the data is printed in correct format |
| 9 | Exercise on Escape Sequence Characters | Write a C program using Escape Sequence Characters | ❖ Know the use of Escape sequence characters<br>❖ Use the Escape sequence characters<br>❖ Check whether the data is read in correct format<br>❖ Rectify the syntax errors<br>❖ Check the output for correctness |
| 10 | Exercise on simple if statement | Write a C program using simple if statement | ❖ Build a relational expression<br>❖ Use the if statement for decision making<br>❖ Rectify the syntax errors<br>❖ Check the output for correctness |
| 11 | Exercise on if..else statement | Write a C program using if..else statement | ❖ Build a relational expression<br>❖ Use the if..else statement for decision making<br>❖ Rectify the syntax errors<br>❖ Check the output for correctness |
| 12 | Exercise on else..if ladder statement | Write a C program using else..if ladder statement | ❖ Use else..if ladder statements with correct syntax<br>❖ Rectify the syntax errors<br>❖ Debug logical errors<br>❖ Check the output for correctness |
| 13 | Exercise on | Write a C program | ❖ Use switch statement with correct |

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

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

| | | | |
|---|---|---|---|
| 24 | Exercise on user-defined function | Write a C program to define and call user-defined functions | ❖ Identify the different parts of function declaration<br>❖ Define function with correct syntax<br>❖ Classify functions based on it parameters and return types<br>❖ Identify parameters passed<br>❖ Identify parameter passing method used<br>❖ Identify return value<br>❖ Rectify the syntax errors<br>❖ Debug logical errors<br>❖ Check for the correctness of output for the given input |
| 25 | Exercise on storage classes | Write a C program using different storage classes | ❖ Know the use of different storage classes<br>❖ Use the different storage classes<br>❖ Check whether the scope of variables is correctly defined or not.<br>❖ Rectify the syntax errors<br>❖ Check the output for correctness |
| 26 | Exercise on parameter passing techniques | Write a C program using parameter passing techniques | ❖ Know the use of parameter passing<br>❖ Use the different parameter passing techniques<br>❖ Check whether the parameters passed correctly or not.<br>❖ Rectify the syntax errors<br>❖ Check the output for correctness |
| 27 | Exercise on recursion | Write a C program using recursion | ❖ Identify where recursive call is made in the function<br>❖ Validate the termination condition<br>❖ Rectify the syntax errors<br>❖ Debug logical errors<br>❖ Check for the correctness of output for the given input |
| 28 | Exercise on pointers | Write a C program using pointer data type | ❖ Declare pointer variable<br>❖ Initialize pointer variable<br>❖ Access a variable through its pointer<br>❖ Rectify the syntax errors<br>❖ Debug logical errors<br>❖ Check for the correctness of output for the given input |
| 29 | Exercise on text files | Write a C program to create a text file, write data into it and read data from it | ❖ Define a file pointer<br>❖ Use the various modes of file opening<br>❖ Close the file<br>❖ Write text into file<br>❖ Read text from file<br>❖ Rectify the syntax errors<br>❖ Debug logical errors |

| | | | |
|---|---|---|---|
| | | | ❖ Check for the correctness of output for the given input |
| 30 | Exercise on macros | Write a C program using macros | ❖ Know the need of macros<br>❖ Use the macros/pre processor directives<br>❖ Rectify the syntax errors<br>❖ Debug logical errors<br>❖ Check for the correctness of output for the given input |

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

| | | |
|---|---|---|
| **SubjectTitle** | **:** | **Physics Laboratory** |
| **SubjectCode** | **:** | **CM-109** |
| **Periodsperweek** | **:** | **03** |
| **Totalperiodsperyear** | **:** | **45** |

**TIMESCHEDULE**

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

**Objectives:**

**Upon completion of the course the student shall be able to**

1.0 Practice with Vernier calipers to determine the volumes and areas of a cylinder and sphere and their comparison etc .

2.0 Practice with Screw gauge to determine thickness of a glass plate, cross sectional area of a wire and volumes of sphere and also their comparison etc

3.0 Verify the parallelogram law and Triangle law

4.0 Determine the value of acceleration due to gravity using Simple Pendulum

5.0 Determine the velocity of sound in air at room temperature and its value at zero degree centigrade

6.0 Calculate the Focal length and focal power of convex lenses using distant object method , U-V method , U-V graph and 1 / U – 1 / V graph methods and their comparison.

7.0 Determine the refractive index of a solid using travelling microscope

8.0 Verify the Boyle's law employing a Quill tube

9.0 Determine the specific resistance of material of a wirel using Meter Bridge

10.0 Drawing magnetic lines of force under N-S and N-N methods and locate null points

11.0 Determine the surface tension of a liquid using travelling Microscope (**Demo)**

12.0 Determine the viscosity of a liquid using capillary method (**Demo)**

**Competencies and Key competencies to be achieved by the student**

| Name of the Experiment (No of Periods) | Competencies | Key competencies |
|---|---|---|
| 1. Hands on practice on Vernier Calipers(03) | • Find the Least count<br>• Fix the specimen in posit<br>• Read the scales<br>• Calculate the physical quantities of given object | • Read the scales<br>• Calculate the requisite physical quantities of given objects |
| 2. Hands on practice on Screw gauge(03) | • Find the Least count<br>• Fix the specimen in posit<br>• Read the scales<br>• Calculate thickness of glass place and cross section of wire and other quantities | • Read the scales<br>• Calculate thickness of given glass plate<br>• Calculate cross section of wire and other quantities |
| 3. Verification of Parallelogram law of forces and Triangle law of forces(03) | • Fix suitable weights<br>• Note the positions of threads on drawing sheet<br>• Find the angle at equilibrium point<br>• Construct parallelogram<br>• Compare the measured diagonal<br>• Construct triangle<br>• Find the length of sides<br>• Compare the ratios | • Find the angle at equilibrium point<br>• Constructing parallelogram<br>• Construct triangle<br>• Compare the ratios of force and length |
| 4. Simple pendulum(03) | • Fix the simple pendulum to the stand<br>• Adjust the length of pendulum<br>• Find the time for number of oscillations<br>• Find the time period<br>• Calculate the acceleration due to gravity<br>• Draw l-T and $l\text{-}T^2$ graph | • Find the time for number of oscillations<br>• Find the time period<br>• Calculate the acceleration due to gravity<br>• Draw l-T and $l\text{-}T^2$ graph |

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

| | | |
|---|---|---|
| 10. Mapping of magnet lines of force(03) | • Draw magnetic meridian<br>• Placed the bar magnet in NN and NS directions<br>• Draw magnetic lines of force<br>• Locate the neutral points along equatorial | • Draw magnetic lines of force<br>• Locate the neutral points |
| 11. Surface tension of liquid usingtraveling microscope(03) | • Find the least count of vernier on microscope<br>• Focus the microscope to the lower meniscus & bent pin<br>• Read the scale<br>• Calculate height of liquid | • Read the scale<br>• Calculate height of liquid rise<br>• Calculate the surface tension of water |
| 12.. Coefficient of viscosity by capillary method(03) | • Find the least count of vernier<br>• Fix the capillary tube to aspiratory bottle<br>• Find the mass of collected water<br>• Find the pressure head | • Find the pressure head<br>• Calculate rate of volume of liquid collected<br>• Find the radius of capillary tube |

**Scheme of Valuation for end Lab Practical Examination :**

A. Writing Aim, Apparatus, Formula, Graph, Precautions carries 10 (Ten) Marks

B. For Drawing the table, taking Readings, Calculation work, Drawing the graph, finding result carries 15 (Fifteen) Marks

C. Viva Voice 05 (Five) Marks

**Total** **30 (Thirty) Marks**

## CHEMISTRYLAB PRACTICE

**(C-20 curriculum common to all Branches)**

**Subject Title : Chemistry Lab oratory**

**Subject Code : CM -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 |

### TIMESCHEDULE

| S.No | Name of the Experiment | No.ofPeriods | Mapped with |
|---|---|---|---|
| 1. | a) Recognition of chemical substances and solutions used in the laboratory by senses. b) Familiarization of methods for Volumetric analysis | 03 | CO1 |
| 2. | Preparation of Std $Na_2CO_3$ and making solutions | 03 | CO1 |
| 3. | EstimationofHClsolutionusingStd.$Na_2CO_3$solution | 03 | CO2 |
| 4. | Estimation of NaOHusing Std. HCl solution | 03 | CO2 |
| 5. | Estimation of $H_2SO_4$usingStd.NaOH solution | 03 | CO2 |
| 6. | Estimation of Mohr's Salt usingStd.$KMnO_4$ | 03 | CO3 |
| 7. | Determination of acidity of water sample | 03 | CO2 |
| 8. | Determination of alkalinity of water sample | 03 | CO2 |
| 9. | Determination of total hardness of water using | 03 | CO4 |
| 10. | Estimation of Chlorides present in water sample | 03 | CO4 |
| 11. | Estimation of Dissolved Oxygen(D.O)in water | 03 | CO5 |
| 12. | Determination of pH using pHmeter | 03 | CO5 |

| | | | |
|---|---|---|---|
| 13. | Determination of conductivity of water and | 03 | CO5 |
| 14. | Determination of turbidity of water | 03 | CO5 |
| 15. | Estimation of total solids present in water sample | 03 | CO5 |
| | **Total:** | **45** | |

**Objectives:**

**Upon completion of the course the student shall be able to**

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

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

3.0 Conduct titrations adopting standard procedures and using Std. $Na_2CO_3$solutionfor 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 and using Std. NaOH solution for estimation of $H_2SO_4$

6.0 Conduct titrations adopting standard procedures and using Std.$KMnO_4$solution for estimation of Mohr's Salt

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

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

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

10.0 Conduct titrations adopting standard procedures to determine the chlorides present in the given samples of water and wastewater (One ground water and one surface / tap water)

11.0 Conduct the test using titrometric / electrometric method to determine Dissolved Oxygen (D.O) in given water samples (One sample from closed container and one from open container / tap water)

12.0 Conduct the test on given samples of water / solutions (like soft drinks, sewage, etc.) to determine their pH using standard pH meter

13.0 Conduct the test on given samples of water / solutions
   a) To determine conductivity
   b) To adjust the ionic strength of the sample to the desired value

14.0 Conduct the test on given samples of solutions (coloured and non coloured) to determine their turbidity in NTU

15.0 To determine the total solids present in given samples of water (One ground water and one surface / tap water)

**Competencies and Key competencies to be achieved by the student**

| **Name of the Experiment (No of Periods)** | **Competencies** | **Key competencies** |
|---|---|---|
| Familiarization of methods for Volumetric analysis. Recognition of chemical substances And solutions(03) | - | -- |
| Preparation of Std $Na_2CO_3$ and making solutions of different dilution(03) | ▪ Weighing the salt to the accuracy of .01 mg<br>▪ Measuring the water with volumetric flask, measuring jar, volumetric pipette and graduated pipette<br>▪ Making appropriate dilutions | ▪ Weighing the salt to the accuracy of .01 mg<br>▪ Measuring the water with volumetric flask, measuring jar, volumetric pipette and graduated pipette<br>▪ Making appropriate dilutions |
| **Name of the Experiment (No of Periods)** | **Competencies** | **Key competencies** |
| Estimation of HCl solution using Std. $Na_2CO_3$solution (03) | ▪ Cleaning the glassware and rinsing with appropriate solutions<br>▪ Making standard solutions<br>▪ Measuring | ▪ Making standard solutions<br>▪ Measuring accurately the standard solutions and titrants<br>▪ Effectively Controlling the |
| Estimation of NaOH using Std. HCl solution (03) | | |
| Estimation of $H_2SO_4$usingStd. NaOH solution (03) | | |

| | | |
|---|---|---|
| Estimation of Mohr's Salt usingStd.$KMnO_4$ (03) | accurately the standard solutions and titrants<br>▪ Filling the burette with titrant<br>▪ Fixing the burette to the stand<br>▪ Effectively Controlling the flow of the titrant<br>▪ Identifying the end point<br>▪ Making accurate observations<br>▪ Calculating the results | flow of the titrant<br>▪ Identifying the end point<br>▪ Making accurate observations |
| Determination of acidity of water sample (03) | | |
| Determination of alkalinity of water sample (03) | | |
| Determination of total hardness of water using Std. EDTA solution (03) | | |
| | | |
| Estimation of Dissolved Oxygen(D.O)in water sample (By titration method) (03) | | |
| Estimation of Dissolved Oxygen(D.O)in water sample (By electrometric method) (03) | ▪ Familiarize with instrument<br>▪ Choose appropriate 'Mode' / 'Unit'<br>▪ Prepare standard solutions / buffers, etc.<br>▪ Standardize the instrument with appropriate standard solutions<br>▪ Plot the standard curve<br>▪ Make measurements accurately<br>▪ Follow Safety precautions | ▪ Prepare standard solutions / buffers, etc.<br>▪ Standardize the instrument with appropriate standard solutions<br>▪ Plot the standard curve<br>▪ Make measurements accurately |
| Determination of pH using pH meter (03) | | |
| Determination of conductivity of water and adjusting ionic strength to required level (03) | | |
| Determination of turbidity of water (03) | | |
| **Name of the Experiment (No of Periods)** | **Competencies** | **Key competencies** |

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

**SCHEME OF VALUATION**

| | | |
|---|---|---|
| A) | Writing Chemicals, apparatus ,principle and procedure | 5M |
| B) | Demonstrated competencies<br>Making standard solutions<br>Measuring accurately the standard solutions and titrants<br>Effectively Controlling the flow of the titrant<br>Identifying the end point<br>Making accurate observations | 20M |
| C) | Viva-voce | 5M |
| | Total | 30M |

## Computer Fundamentals Lab

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

**Time schedule:**

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

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

| | At the end of the course students will be able to | | |
|---|---|---|---|
| **Course Outcomes** | CO1 | CM -110.1 | Identify hardware and software components |
| | CO2 | CM -110.2 | Prepare documents with given specifications using word processing software |
| | CO3 | CM -110.3 | Use Spread sheet software to make calculation and to draw various graphs / charts. |
| | CO4 | CM -110.4 | Use Power point software to develop effective presentation for a given theme or topic. |
| | CO5 | CM -110.5 | 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) Reset Button<br>b. Identify and connect various peripherals<br>c. Identify and connect the cables used with computer system<br>d. Identify various ports on CPU and connect Keyboard & Mouse | Connect cables to external hardware and operate the computer |
| (b). | To Start and Shut down Computer correctly | a. Log in using the password<br>b. Start and shut down the computer<br>c. Use Mouse and Key Board | a. Login and logout as per the standard procedure<br>b. Operate mouse &Key Board |
| (c). | To Explore Windows Desktop | a. Familiarize with Start Menu, Taskbar, Icons and Shortcuts<br>b. Access application programs using Start menu, Task manager<br>c. Use Help support | a. Access application programs using Start menu<br>b. Use taskbar and Task manager |
| 2. | To check the software details of the computer | a. Find the details of Operating System being used<br>b. Find the details of Service Pack installed | Access the properties of computer and find the details |
| 3. | To check the hardware present in your computer | a. Find the CPU name and clock speed<br>b. Find the details of RAM and Hard disk present<br>c. Access Device manager using Control Panel and check the status of devices like mouse and key board<br>d. Use My Computer to check the details of Hard | a. Access device manager and find the details<br>b. Type /Navigate the correct path and Select icon related to the details required |

| | | | |
|---|---|---|---|
| | | drives and partitions<br>e. Use the Taskbar | |
| 4. | Working with Files and Folders | a. Create folders and organizing files in different folders<br>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<br><br>Continued.... | c. Arrange icons – name wise, size, type, Modified<br>d. Search a file or folder and find its path<br>e. Create shortcut to files and folders (in other folders) on Desktop<br>f. Familiarize with the use of My Documents<br>g. Familiarize with the use of Recycle Bin | b. Restore deleted files from Recycle bin |
| 5. | To use Windows Accessories:<br><br>Calculator – Notepad – WordPad – MS Paint | a. Familiarize with the use of Calculator<br>b. Access Calculator using Run command<br>c. Create Text Files using Notepad and WordPad and observe the difference in file size<br>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.<br><br>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<br>b. Use Save and Save as features<br>c. Work on two Word documents simultaneously<br>d. Choose correct Paper size and Printing options | a. Create a Document and name appropriately and save<br>b. Set paper size and print options |
| 7. | To practice Word Processing Basics | a. Typing text<br>b. Keyboard usage<br>c. Use mouse (Left click / Right click / Scroll)<br>d. Use Keyboard shortcuts<br>e. Use Find and Replace features in MS- word<br>f. Use Undo and Redo Features<br>g. Use spell check to correct Spellings and Grammar | a. Use key board and mouse to enter/edit text in the document.<br>b. Use shortcuts<br>c. Use spell check/ Grammar features for auto corrections. |

| | | | |
|---|---|---|---|
| 8. | To practice Formatting techniques | a. Formatting Text<br>b. Formatting Paragraphs<br>c. Setting Tabs<br>d. Formatting Pages<br>e. The Styles of Word<br>f. Insert bullets and numbers<br>g. Themes and Templates<br>h. Insert page numbers, header and footer | a. Format Text and paragraphs and use various text styles.<br>b. Use bullets and numbers to create lists<br>c. Use Templates /Themes<br>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<br>b. Changing the background colour of the table<br>c. Use table design tools<br>d. Use auto fit – fixed row/ column height/length – Even distribution of rows / columns features<br>e. Convert Text to table and Table to Text<br>f. Use Sort feature of the Table to arrange data in ascending/descending order | a. Insert table in the word document and edit<br>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.<br>b. Create an organization chart<br>c. Practice examples like preparing an Examination schedule notice with a hyperlink to Exam schedule table. | a. Insert hyperlinks &Bookmarks<br>b. Create organization charts/flow charts |
| 11. | To Use Mail merge feature of MS Word | a. Use mail merge to prepare individually addressed letters<br>b. Use mail merge to print | Use Mail merge feature |

| | | | |
|---|---|---|---|
| | | envelopes. | |
| 12. | To use Equations and symbols features. | a. Explore various symbols available in MS Word<br>b. Insert a symbol in the text<br>c. Insert mathematical equations in the document | Enter Mathematical symbols and Equations in the word document |
| 13. | To Practice with MS-EXCEL | a. Open /create an MS Excel spread sheet and familiarize with MS Excel 2007 layout like MS office Button-<br>b. Use Quick Access Toolbar- Title Bar-Ribbon-Worksheets-Formula Bar-Status Bar | a. Familiarize with excel layout and use<br>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<br>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<br>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<br>b. Add Background Color-Change the Font, Font Size, and Font Color<br>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<br>b. Perform Automatic Calculations-Align Cell Entries | Use built in functions in Excel |
| 17. | To enter a Formula for automatic calculations | a. Enter formula<br>b. Use Cell References in Formulae | Enter formula for |

| | | | |
|---|---|---|---|
| | | c. Use Automatic updating function of Excel Formulae<br>d. Use Mathematical Operators in Formulae<br>e. Use Excel Error Message and Help | automatic calculations |
| 18. | To Create Excel Functions, Filling Cells | a. Use Reference Operators<br>b. Work with sum, Sum if , Count and Count If Functions<br>c. Fill Cells Automatically | a. Create Excel sheets involving cross references and equations<br>b. Use the advanced functions for conditional calculations |
| 19. | To sort and filter data in table | a. Sort data in multiple columns<br>b. Sort data in a row<br>c. Sort data using Custom order<br>d. Filter data in work sheet | a. Refine the data in a worksheet and keep it organized<br>b. Narrow a worksheet by selecting specific choice |
| 20. | To Practice Excel Graphs and Charts | a. Produce an Excel Pie Chart<br>b. Produce<br>c. Excel Column Chart | a. Use data in Excel sheet to Create technical charts and graphs Produce Excel Line Graph<br>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<br>b. Add currency and percentage symbols<br>c. Change height of a row and width of a column<br>d. Change data alignment<br>e. Insert Headers and Footers<br>f. Set Print Options and Print | a. Format Excel sheet<br>b. Insert headers &footers and print |

| | | | |
|---|---|---|---|
| 23. | To familiarize with Ribbon layout &features of PowerPoint 2007. | Use various options in PowerPoint<br>a. Home<br>b. Insert<br>c. Design<br>d. Animation<br>e. Slideshow<br>f. View<br>g. Review | Access required options in the tool bar |
| 24. | To create a simple PowerPoint Presentation | a. Insert a New Slide into PowerPoint<br>b. Change the Title of a PowerPoint Slide<br>c. PowerPoint Bullets<br>d. Add an Image to a PowerPoint Slide<br>e. Add a Textbox to a PowerPoint slide | a. Create simple PowerPoint presentation with photographs/Clip Art and text boxes<br>b. Use bullets option |
| 25. | To Set up a Master Slide in PowerPoint and add notes | a. Create a PowerPoint Design Template<br>b. Modify themes<br>c. Switch between Slide master view and Normal view<br>d. Format a Design Template Master Slide<br>e. Add a Title Slide to a Design Template<br>f. The Slide Show Footer in PowerPoint<br>g. Add Notes to a PowerPoint Presentation | a. Setup Master slide and format<br>b. Add notes |
| 26. | To Insert Text and Objects | a. Insert Text and objects<br>b. Set Indents and line spacing<br>c. Insert pictures/ clipart<br>d. Format pictures<br>e. Insert shapes and word art<br>f. Use 3d features<br>g. Arrange objects | Insert Text and Objects<br><br>Use 3d features |
| 27. | To insert a Flow Chart / Organizational Charts | a. Create a Flow Chart in PowerPoint<br>b. Group and Ungroup Shapes<br>c. Use smart art | Create organizational charts and flow charts using smart art |

| | | | |
|---|---|---|---|
| 28. | To insert a Table | a. PowerPoint Tables<br>b. Format the Table Data<br>c. Change Table Background<br>d. Format Series Legend | Insert tables and format |
| 29. | To insert a Charts/Graphs | a. Create 3D Bar Graphs in PowerPoint<br>b. Work with the PowerPoint Datasheet<br>c. Format a PowerPoint Chart Axis<br>d. Format the Bars of a Chart<br>e. Create PowerPoint Pie Charts<br>f. Use Pie Chart Segments<br>g. Create 2D Bar Charts in PowerPoint<br>h. Format the 2D Chart<br>e. Format a Chart Background | Create charts and Bar graphs, Pie Charts and format. |
| 30. | To Insert audio & video, Hyperlinks in a slide<br><br>Add narration to the slide | a. Insert sounds in the slide and hide the audio symbol<br>b. Adjust the volume in the settings<br>c. Insert video file in the format supported by PowerPoint in a slide<br>d. Use automatic and on click options<br>e. Add narration to the slide<br>f. Insert Hyperlinks | a. Insert Sounds and Video in appropriate format.<br>b. Add narration to the slide<br>c. Use hyperlinks to switch to different slides and files |
| 31. | To Practice Animation effects | a. Apply transitions to slides<br>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<br>b. Previewing presentation<br>c. Set up slide show<br>d. Set up resolution<br>e. Exercise with Rehearse Timings feature in PowerPoint<br>f. Use PowerPoint Pen Tool during slide show<br>g. Saving | a. Use Spell check and Grammar feature<br>b. Setup slide show<br>c. Add timing to the slides<br>d. Setup automatic slide show |

| | | | |
|---|---|---|---|
| | | h. Printing presentation<br>(a) Slides<br>(b) Hand-out | |
| 33 | To familiarize with standard toolbox | a. Open Adobe Photoshop<br>b. Use various tools such as<br>i. The Layer Tool<br>ii. The Color& Swatches Tool<br>iii. Custom Fonts & The Text Tool<br>iv. Brush Tool<br>v. The Select Tool<br>vi. The Move Tool<br>vii. The Zoom Tool<br>viii. The Eraser<br>ix. The Crop Tool<br>x. The Fill Tool | Open a photograph and save it in Photoshop |
| 34 | To edit a photograph | a. Use the Crop tool<br>b. Trim edges<br>c. Change the shape and size of a photo<br>d. Remove the part of photograph including graphics and text | a. Able to edit image by using corresponding tools. |
| 35 | To insert Borders around photograph | a. Start with a single background layer<br>b. Bring the background forward<br>c. Enlarge the canvas<br>d. Create a border color<br>e. Send the border color to the back<br>f. Experiment with different colors | Able to create a border or frame around an image to add visual interest to a photo |
| 36 | To change Background of a Photograph | a. open the foreground and background image<br>b. Use different selection tools to paint over the image<br>c. Copy background image and paste it on the foreground.<br>d. Resize and/or drag the background image to reposition.<br>e. In the Layers panel, drag the background layer below the foreground image layer. | Able to swap background elements using the Select and Mask tool and layers. |

| | | | |
|---|---|---|---|
| 37 | To change colors of Photograph | a. Change colors using:<br>i) Color Replacement tool<br>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.<br>b. apply two different colors to work area by dividing it into two parts using Rectangle tool.<br>c. Copy any picture and place it on work area→ resize it using free transform tool.<br>d. Type text and apply color and style<br>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.<br>b. Go to image→ adjustments→ Brightness/Contrast.<br>c. adjust the brightness and contrast.<br>d. save the image. | Able to control brightness/contrast. |
| 40 | To type a word and apply the shadow emboss effects | a. open a file<br>b. Select the text tool and type text.<br>c. Select the typed text go to layer→ layer style→ blended option→ drop shadow, inner shadow, bevel and emboss→ contour→ satin→ gradient overlay<br>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 COMPUTER ENGINEERING**
**SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2020**

**III Semester**

| Sub Code | Name of the Subject | Instruction Periods/Week | | Total Periods Per Semester | Scheme Of Examinations | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Practicals | | Duration (hrs) | Sessional Marks | End Exam Marks | Total Marks |
| **THEORY SUBJECTS** | | | | | | | | |
| CM-301 | Mathematics –II | 4 | | 60 | 3 | 20 | 80 | 100 |
| CM-302 | Digital Electronics | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-303 | Operating systems | 4 | - | 60 | 3 | 20 | 80 | 100 |
| CM-304 | Data Structures through C | 6 | - | 90 | 3 | 20 | 80 | 100 |
| CM-305 | DBMS | 6 | - | 90 | 3 | 20 | 80 | 100 |
| **PRACTICAL SUBJECTS** | | | | | | | | |
| CM-306 | Digital Electronics Lab | - | 3 | 45 | 3 | 40 | 60 | 100 |
| CM-307 | Data Structures Through C Lab | - | 6 | 90 | 3 | 40 | 60 | 100 |
| CM-308 | DBMS Lab | - | 4 | 60 | 3 | 40 | 60 | 100 |
| CM-309 | Multimedia Lab | | 4 | 60 | 3 | 40 | 60 | 100 |
| | **Total** | **25** | **17** | **630** | | **260** | **640** | **900** |

CM-301 common with all branches
CM-303,304,305,307,308,309 common with DIT branch

## ENGINEERING MATHEMATICS-II

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

| S.No. | Unit Title | No. of periods | COs mapped |
|---|---|---|---|
| 1 | Indefinite Integration | 22 | CO1 |
| 2 | Definite Integration and its applications | 24 | CO2 |
| 3 | Differential Equations of first order | 14 | CO3 |
| Total Periods | | 60 | |

| | | |
|---|---|---|
| **Course Outcomes** | Upon completion of the course the student shall be able | |
| | CO1 | Integrate various functions using different methods. |
| | CO2 | Evaluate definite integrals with applications. |
| | CO3 | Obtain differential equations and solve differential equations of first order and first degree. |

**C-20**

**ENGINEERING MATHEMATICS – II**

**Learning Outcomes**

**Unit-I**

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

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

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

1.3. Solve integration problems involving standard functions using the above rules.

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

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

ii) $\int [f(x)]^n f'(x)\,dx$

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

iv) $\int f\{g(x)\}\, g'(x)\,dx$

1.5. Find the integrals of *tan x, cot x, sec x* and *cosec x* using the above.

1.6. Evaluate the integrals of the form $\int \sin^m x \cos^n x\,dx$ where m and n are suitable positive integers.

1.7. Evaluate integrals of suitable powers of *tan x* and *sec x*.

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

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

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

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

1.9. Evaluate the integrals of the type

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

1.10. Evaluate integrals using decomposition method.

1.11. Solve problems using integration by parts.

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

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

**Unit-II**

**C.O.2 Evaluate definite integrals with applications.**

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

2.2. Explain the concept of definite integral.

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

2.4. State various properties of definite integrals.

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

Syllabus for Unit test-I completed

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

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

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

2.9. Obtain the volumes of solids of revolution.

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

**Unit -III**

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

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

3.2 Find order and degree of a given differential equation.

3.3 Form a differential equation by eliminating arbitrary constants.

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

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

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

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

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

3.9 Solve simple problems arising in engineering applications.

| Syllabus for Unit test-II completed |
|---|

**C-20**

**ENGINEERING MATHEMATICS – II**

**COURSE CONTENTS**

**Unit-I**

**Indefinite Integration .**

**1.** Integration regarded as anti-derivative – Indefinite integrals of standard functions. Properties of indefinite integrals. Integration by substitution or change of variable. Integrals of tan x, cot x, sec x, cosec x. Integrals of the form $\int \sin^m x.\cos^n x\,dx$, where at least one of m and n is odd positive integers. Integrals of suitable powers of tanx. secx and cosecx.cotx by substitution.

Evaluation of integrals which are reducible to the following forms:

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

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

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

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

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

**Unit-II**

**Definite Integral and its applications:**

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

## Unit -III

**Differential Equations:**

3. Definition of a differential equation-order and degree of a differential equation-formation of differential equations-solutions of differential equations of first order and first degree using methods, variables separable, homogeneous, exact, linear differential equation, Bernoulli's equation.

**Textbook:**

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

**Reference Books:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers.

2. Schaum's Outlines Differential Equations, Richard Bronson & Gabriel B. Costa

3. M.Vygodsky, Mathematical Handbook: Higher Mathematics, Mir Publishers, Moscow.

## BLUE PRINT

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

**R: Remembering Type : 25 Marks**

**U: understanding Type : 17 Marks**

**Ap: Application Type : 20 Marks**

**An: Analysing Type : 18 Marks**

**C-20**

**Engineering Mathematics – II**

**Unit Test Syllabus**

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

## DIGITAL ELECTRONICS

| Course code | Course Title | No. of Periods/ Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-302 | Digital Electronics | 5 | 75 | 20 | 80 |

| S. No. | Chapter/Unit Title | No. of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Number systems | 15 | CO1 |
| 2. | Logic Gates, Boolean Algebra and basic Combinational circuits | 17 | CO2 |
| 3. | Flip-Flops | 15 | CO3 |
| 4. | Counters and registers | 17 | CO4 |
| 5. | Additional Combinational Circuits | 11 | CO5 |
| Total Periods | | 75 | |

| | | | |
|---|---|---|---|
| **Course Outcomes** | Upon completion of the course the student shall be able to | | |
| | CO1 | CM-302.1 | Explain the structure of various number systems. |
| | CO2 | CM-302.2 | Describe fundamental concepts and techniques used in digital electronics, the switching algebra theorems and logic gates and apply them to design logic circuits using K-Maps |
| | CO3 | CM-302.3 | Explain the operation of flip flops |
| | CO4 | CM-302.4 | Design the counting circuits, Registers using flipflop operations. |
| | CO5 | CM-302.5 | Analyse various sequential circuits and combinational circuits |

**Learning Outcomes:**

**1.0 Number systems**

1.1 List the various number systems used in digital Computer.
1.2 Explain Decimal number system
1.3 Explain Binary number system
1.4 Explain octal number system
1.5 Explain Hexadecimal number system
1.6 Convert decimal number to other base conversion.
  1.6.1 Decimal to Binary
  1.6.2 Decimal to Octal
  1.6.3 Decimal to Hexadecimal
1.7 Convert binary number to other base conversion.
  1.7.1 Binary to Decimal
  1.7.2 Binary to octal
  1.7.3 Binary to Hexadecimal

1.8 Convert Octal number to other base conversion.
- 1.8.1 Octal to Decimal
- 1.8.2 Octal to Binary
- 1.8.3 Octal to Hexadecimal

1.9 Convert hexadecimal other base conversion.
- 1.9.1 Hexadecimal to Decimal
- 1.9.2 Hexadecimal to Binary
- 1.9.3 Hexadecimal to Octal

1.10 Binary number representation.
- 1.10.1 Define Binary numbers representation.
- 1.10.2 List the types of Binary numbers representation.
- 1.10.3 Explain Unsigned binary number representation.
- 1.10.4 Explain Signed binary number representation.
- 1.10.5 Explain Signed binary arithmetic.
- 1.10.6 Illustrate addition of two signed binary numbers.
- 1.10.7 Illustrate subtraction of two signed binary numbers.
- 1.10.8 Illustrate binary multiplication.
- 1.10.9 Illustrate Binary division.

1.11 Binary coded decimal (BCD) coding scheme.
- 1.11.1 Define Binary coded decimal (BCD) coding scheme.
- 1.11.2 List the types of Binary coded decimal (BCD)
- 1.11.3 Draw and explain 8421 codes.
- 1.11.4 Draw and explain 2421 code.
- 1.11.5 Draw and explain 8 4-2-1 code.
- 1.11.6 Draw and explain Excess 3 code.
- 1.11.7 Draw and explain Gray code.
- 1.11.8 Explain Character representation
- 1.11.9 List character representation codes
- 1.11.10 Explain the ASCII coding scheme.
- 1.11.11 Explain the EBCDIC coding scheme.

**2.0 Boolean Algebra, Logic gates and Basic Combinational Circuits**

2.1 Define Boolean algebra
2.2 Explain AND, OR, NOT operations with truth tables.
2.3 Explain the working of EX-OR and EX-NOR operations with truth tables.
2.4 List the different postulates in Boolean algebra.
2.5 State De-Morgan ‘s theorems.
2.6 Prove De-Morgan’s theorems using truth tables.
2.7 Apply De-Morgan ‘s theorems and other postulates of Boolean algebra to simplify the given Boolean expression.
2.8 Generate Boolean expression for given truth table.
2.9 Use Sum-Of-Products (SOP) method
2.10 Use Product-Of-Sums (POS)method
2.11 Use K – map to simplify Boolean expression (up to 4 variables).
2.12 Use Two variable K-Map, Three variable K-Map and Four variable K-Map
2.13 Logic Gates
- 2.13.1 Define Logic gate
- 2.13.2 List basic gates
- 2.13.3 Define OR gate
- 2.13.4 Explain OR gate with logic symbol and truth table.
- 2.13.5 Define AND gate
- 2.13.6 Explain AND gate with logic symbol and truth table.

2.13.7 Define NOT gate
2.13.8 Explain NOT gate with logic symbol and truth table.
2.13.9 What is universal gate? List universal gates
2.13.10 Define NOR gate
2.13.11 Explain NOR gate with logic symbol and truth table.
2.13.12 Define NAND gate
2.13.13 Explain NAND gate with logic symbol and truth table.
2.13.14 Define EX-OR and EX-NOR gates
2.13.15 Explain the working of EX-OR and EX-NOR gates with truth tables.
2.13.16 Implement AND, OR, NOT, EX-OR gates using NAND gates only
2.13.17 Implement AND, OR, NOT, EX-OR gates using NOR gate only.

2.14 Basic Combinational Circuits

2.14.1 Define the Half Adder. Explain the function of Half Adder.
2.14.2 Draw Half-Adder circuit using an exclusive OR and an AND gate.
2.14.3 Draw a Half–Adder using only NAND gates or only NOR gates.
2.14.4 Define the Full Adder. Explain the function of Full Adder.
2.14.5 Construct Full Adder using two Half-Adder and an OR gate
2.14.6 Define the parallel Adder
2.14.7 Explain the function of parallel Adder using logic symbol.
2.14.8 Draw and explain 4-bit parallel adder using full adders.
2.14.9 Draw and explain 4-bit parallel adder/ 2‘s complement subtractor circuit.
2.14.10 Explain the working of a serial adder with a block diagram.
2.14.11 List the advantage and disadvantages of a serial adder
2.14.12 List the advantage and disadvantages of a parallel adder.
2.14.13 Distinguish between serial adder and parallel adder.
2.14.14 Explain the operation of a digital comparator circuit for two 4-bit words.

**3.0 Flip Flops**

**3.1** List the details of different logic families**.**
3.2 Define positive and negative logic levels.
3.3 Define Flip flop.
3.4 Draw and explain the basic principle of operation of a Flip-flop.
3.5 Define Latch.
3.6 Explain the working of a NAND latch circuit with truth table and Timing diagram.
3.7 Explain the working of a NOR latch circuit with truth table and Timing diagram.
3.8 Differentiate between Latch and Flip-flop.
3.9 Define Triggering.
3.10 List the types of Triggering.
3.11 Draw and explain the concept of edge triggering (positive, negative)
3.12 Draw and explain the concept of level triggering. (Positive, negative)
3.13 Explain with block diagram, waveforms and truth tables the working of RS Flip-flop.
3.14 Explain with block diagram, waveforms and truth tables the working of RST Flip-flop.
3.15 Explain with block diagram, waveforms and truth tables the working of D Flip-flop.

3.16 Explain with block diagram, waveforms and truth tables the working of JK Flip-flop.
3.17 Explain with block diagram, waveforms and truth tables the working of T Flip-flop.
3.18 Distinguish between synchronous and asynchronous inputs of a flip- flop and state
the its functions.
3.19 Draw and explain the need for a Master-Slave flip-flop.
3.20 Explain the working of a Master-Slave flip-flop using suitable circuit diagram and truth table.

**4.0 Counters and Registers**

4.1 Counters
4.1.1 Define Counter
4.1.2 List the types of counters.
4.1.3 Define Synchronous counter
4.1.4 Define Asynchronous counter
4.1.5 Distinguish between asynchronous and synchronous counters.
4.1.6 Draw and explain module-8 ripple counter circuit diagram with waveforms and truth tables
4.1.7 Draw and explain module-16 ripple counter circuit diagram with waveforms and truth tables
4.1.8 Draw and explain module-10 (decade) Asynchronous counter circuit diagram with Waveforms and truth tables
4.1.9 Draw and explain module-8 synchronous counter circuit diagram with waveforms and truth tables
4.1.10 Draw and explain module-16 synchronous counter circuit diagram with waveforms and truth tables
4.1.11 Draw and explain module-10 synchronous counter circuit diagram with waveforms and truth tables
4.1.12 List the draw backs of ripple counters.
4.1.13 List the advantages of synchronous counters
4.1.14 Explain the operation of a up/down counter circuit diagram with waveforms and truth tables
4.1.15 Define Programmable counter
4.1.16 Draw and explain the need for a Programmable counter
4.1.17 Explain how to design Programmable counter circuit diagram
4.1.18 Draw and explain the operation of a 4-bit ring counter.
4.1.19 List the applications of counter.

4.2 Register
4.2.1 Define Register
4.2.2 State the need of Register.
4.2.3 List the methods of data transfer in register.
4.2.4 List the types of Registers
4.2.5 Define Serial in – Serial out register
4.2.6 Define Serial in – Parallel out register
4.2.7 Define Parallel in – Serial out register
4.2.8 Define Parallel in – Parallel out register
4.2.9 Explain the working of serial in – serial out register with circuit diagram.
4.2.10 Explain the working of serial in – parallel out register with circuit diagram.
4.2.11 Explain the working of shift left Register with circuit diagram.
4.2.12 Explain the working of shift right registers with circuit diagram.
4.2.13 Explain the working of universal shift register.
4.2.14 Draw and explain the use of shift register as memory.

**5.0 Additional Combinational Circuits**

5.1 Define data selector and state its importance.
5.2 Define the terms Multiplexer and Demultiplexer.
5.3 Draw and explain the operation of a Multiplexer circuit diagram with truth table.
5.4 Draw and explain the operation of Demultiplexer circuit diagram with truth table.
5.5 List the applications of Multiplexers.
5.6 List the applications of Demultiplexers.
5.7 Define the terms Encoder and Decoder.
5.8 Draw and explain the operation of a 4 to10 line decoder circuit diagram with truth table.
5.9 Draw and explain the operation of an 8 to 3 encoder circuit diagram with truth table.
5.10 List applications of Decoders.
5.11 List applications of Encoders.
5.12 Define Programmable logic Devices.
5.13 List the types of Programmable logic Devices.
5.14 Draw and explain the Programmable Logic Array (PLA).

**COURSE CONTENTS**

**1. Number Systems:** Number Systems, Decimal, Binary, Hexadecimal and Octal codes, Conversion from one number system to another number system, Binary numbers representation, Binary Arithmetic, BCD, Character representation-ASCII and EBCDIC code for characters.

**2. Boolean algebra and Logical Gates:** AND, OR, NAND, NOT, NOR & EX-OR gates. Logical definitions – Symbols – truth tables. Boolean theorems, Boolean simplifications of Boolean expressions, Using De-Morgan ‘s theorems, Formation and implementation of Logic expressions, Karnaugh ‘s mapping, Applications involving developing of combinational logic circuits. Half-Adder, Full-adder, Subtractor series – Parallel Binary adder – Parallel adder/subtractor circuits.

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

**4. Counters:** Basic Asynchronous, Synchronous Binary and Decade counter and the Ripple counter, their use Decade counter, Up and Down counters, Ring counter.

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

**5. Additional Combinational Circuits** Multiplexers, Demultiplexers and Encoders, Decoders-operation of a multiplexer with a circuit diagram - operation of a demultiplexer with a circuit diagram - applications of multiplexers and demultiplexers-operation of a 4-to-10-line decoder - operation of an 8-to-3-line encoder, Programmable logic array.

**REFERENCE BOOKS**


1. Digital principles and applications, Malvino and leach- SIE publications.
2. Digital Electronics, Bignell- Delmar Cengage Learning.
3. Modern Digital Electronics, R.P Jain- Tata Mc Graw Hill Education.
4. Computer System Architecture, Morris Mano -Pearson Edition
5. Introduction to Digital Systems, James Palmer, David Perlman- Tata Mc Graw Hill Education.


**MODEL BLUE PRINT**

| S.No. | Chapter/Unit title | No.of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Number systems | 15 | 14 | 3 | 11 | | | 1 | 2 | | | CO1 |
| 2 | Logic Gates, Boolean Algebra and basic Combinational circuits | 17 | 14 | 6 | 11 | | * | 2 | 2 | | * | CO2 |
| 3 | Flip-Flops | 15 | 14 | 3 | 11 | | * | 1 | 2 | | * | CO3 |
| 4 | Counters and registers | 17 | 14 | 3 | 11 | | * | 1 | 2 | | * | CO4 |
| 5 | Additional Combinational circuits | 11 | 14 | 3 | 8 | | * | 1 | 1 | | * | CO5 |
| | Total | 75 | 70+10 (*) | 18 | 52 | | 10* | 6 | 9 | | 1 | |

Note: Part-C: 10 marks single analytical question may be chosen from any one of the chapters marked with *.

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

| Unit Test | Learning outcomes to be covered |
|---|---|
| Unit test-1 | From 1.1 to 3.8 |
| Unit test-2 | From 3.9 to 5.14 |

## OPERATING SYSTEMS

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

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

| | | | |
|---|---|---|---|
| **Course Out comes** | Upon completion of the course the student shall be able | | |
| | CO1 | CM-303.1 | Explain basic concepts of Operating System |
| | CO2 | CM-303.2 | Analyse a given process scheduling algorithm |
| | CO3 | CM-303.3 | Describe Semaphores, synchronization and Deadlock handling techniques |
| | CO4 | CM-303.4 | Use memory management techniques and page replacement algorithms |
| | CO5 | CM-303.5 | Use Disk scheduling algorithms and File allocation methods with respect to different operating systems |

**Learning Outcomes:**

**1.0 Introduction to operating systems**

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

1.10 Define system call with an example
1.11 List and explain different types of system calls
1.12 Define single user, multi user operating system structure

**2.0 Process management**

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

**3.0 Synchronization & Deadlocks**

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

**4.0 Memory management**

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

4.15 Explain the concept of thrashing
4.16 Explain working set model and page fault frequency

**5.0 Disk scheduling and File management**

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

**COURSE CONTENT**

1.0 **Introduction to operating systems**

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

**2. Process management**

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

**3. Synchronization & Deadlocks**

InterProcess Communications - semaphores – monitors Deadlocks - principal of deadlock - deadlock prevention - deadlock detection - deadlock avoidance.

**4. Memory management**

Memory Hierarchy, Address binding -Dynamic Loading- dynamic linking-overlays-swapping- memory allocation-fragmentation-paging-segmentation- segmentation with paging-Benefits of virtual memory - virtual memory techniques - demand paging - page replacements - page replacement algorithms – thrashing.

**5.Disk scheduling and File management**

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

**REFERENCE BOOKS**

1. Operating Systems, Silber Schatz and Galvin- Wiley
2. Operating Systems, William Stallings-Prentice Hall
3. Operating Systems, Dietel and Dietel -Pearson

4. Operating Systems, Dham here -TMH
5. Advanced Operating Systems, Tanenbaum- Prentice Hall

**MODEL BLUE PRINT**

| S. No. | Chapter/Unit title | No. of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Introduction to Operating system | 12 | 14 | 6 | 8 | | | 2 | 1 | | | CO1 |
| 2 | Process management | 12 | 14 | 6 | 8 | | | 2 | 1 | | | CO2 |
| 3 | Synchronization & Deadlocks | 12 | 14 | 3 | 3 | 8 | * | 1 | 1 | 1 | * | CO3 |
| 4 | Memory management | 12 | 14 | 6 | 8 | | | 2 | 1 | | | CO4 |
| 5 | Disk scheduling and File management | 12 | 14 | 3 | 11 | | * | 1 | 2 | | * | CO5 |
| | **Total** | **60** | **70+(10*)** | **24** | **38** | **8** | **10*** | **8** | **6** | 1 | 1 | |

Note: Part-C: 10 marks single analytical question may be chosen from chapters marked with *.

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

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

## DATA STRUCTURES THROUGH C

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| **CM-304** | Data Structures Through C | **6** | **90** | **20** | **80** |

| S. No. | Chapter/Unit Title | No. of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Introduction to Data structures, Searching and Sorting | 30 | CO1 |
| 2. | Linked Storage Representation-Linked Lists | 18 | CO2 |
| 3. | Linear Data Structures-Stacks | 12 | CO3 |
| 4. | Linear Data Structures-Queues | 10 | CO4 |
| 5. | Non-Linear Data Structures-Trees | 20 | CO5 |
| Total Periods | | 90 | |

| | | | |
|---|---|---|---|
| **Course Out comes** | Upon completion of the course the student shall be able | | |
| | CO1 | CM-304.1 | Illustrate various techniques of sorting and searching |
| | CO2 | CM-304.2 | Explain the operations on Various Linked Lists |
| | CO3 | CM-304.3 | Apply the operations of Stack. |
| | CO4 | CM-304.4 | Explain the operations of different types of Queue. |
| | CO5 | CM-304.5 | Apply Binary tree traversal techniques. |

**Learning Outcomes:**

### 1. Introduction to Data Structures, Searching and Sorting

#### 1.1 Understand various types of Data Structures

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

#### 1.2 Searching and Sorting

#### 1.2.1 Various Sorting Techniques

**1.2.1.1** Define Sorting.
1.2.1.2 State the need of Sorting.
1.2.1.3 List the methods of Sorting.

1.2.1.4 Explain the procedure, algorithm, program and time complexity of the following Sorting techniques:

a) Bubble Sort,
b) Selection Sort,
c) Insertion Sort,
d) Quick Sort, and
e) Merge Sort.

1.2.2 **Various Searching Techniques**

1.2.2.1 Define searching
1.2.2.2 State the need of searching.
1.2.2.3 List two types of searching.
1.2.2.4 Explain the procedure, algorithm, program and time complexity of the following Searching techniques:

a) Linear Search,
b) Binary Search,

**2. Linked Storage Representation –Linked Lists**

**2.1** .List the advantages & disadvantages of Linked Lists over Arrays.
**2.2** .State the purpose of Dummy Header.
**2.3** .Explain the following for Singly Linked List

- Structure
- Creation
- How to represent a node using 'C' Structure
- Perform insertion, deletion, traverse and sort operations
- Perform search and replace an element
- C Program with all operations.

**2.4** . Explain the following for Singly Circular Linked List.

- Structure
- Creation
- How to represent a node using 'C' Structure
- Perform insertion, deletion, traverse and sort operations
- Perform search and replace an element
- C Program with all operations.

**2.5** . Explain the following for Doubly Linked List.

- Structure
- Creation
- How to represent a node using 'C' Structure
- Perform insertion, deletion, traverse and sort operations
- Perform search and replace an element
- C Program with all operations.

**2.6** . Explain the following for Doubly Circular Linked List.

- Structure
- Creation
- How to represent a node using 'C' Structure
- Perform insertion, deletion, traverse and sort operations
- Perform search and replace an element
- C Program with all operations.

2.7. List the advantages of a Singly Circular Linked List over a Singly Linked List

2.8. Describe the changes require in a singly linked list program to make it the Singly Circular List.
2.9. List the advantages of a Doubly Circular Linked List over a Doubly Linked List
2.10. Describe the changes require in a Doubly Linked List program to make it the Doubly Circular List.

## 3. Linear Data Structures-Stacks

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

## 4. Linear Data Structures-Queues

**4.1** Define Queue
**4.2** Explain the insertion, deletion and display operations on Queues
**4.3** Explain array implementation of a Queue & its operations.
**4.4** Write the program for Array implementation of a Queue & its operations.
**4.5** Explain Linked List implementation of a Queue & its operations.
**4.6** Write the program for Linked List implementation of a Queue & its operations.
**4.7** Know about Circular Queues
**4.8** Explain array implementation of a Circular Queue & its operations
**4.9** Write the program for Array implementation of a Circular Queue & its operations
**4.10** Explain Linked List implementation of a Circular Queue & its operations.
**4.11** Write the program for Linked List implementation of a Circular Queue & its operations.
**4.12** List the application of Queues
**4.13** Know about Priority Queues

## 5. Non-Linear Data Structures-Trees

**5.1** Define a Tree
**5.1.1** Explain the terminology related to Tree (Root, Edge, Parent, Child, Siblings, Leaf, Internal nodes, Degree, Level, Height, Depth, Path, Sub tree, Forest).
**5.2** Define Binary Tree
**5.3** Write the differences between General Tree and Binary Tree.
**5.4** Convert General Trees to Binary Trees
**5.5** Explain the linear representation and linked list representation of a Binary Tree.
**5.6** Define Binary Search Tree

**5.7** Write differences between Binary Search Tree and Binary Tree
**5.8** Perform various traversals on Binary Trees
**5.9** Construct a Binary Tree using In-order and Preorder Traversals
**5.10** Construct a Binary Tree using In-order and Post-order Traversals
**5.11** Know the importance of Binary Search Trees over General Trees
**5.12** Perform insertion, deletion, search and various traversal operations on a Binary Search Tree.
**5.13** Write the program to implement Binary Search Tree operations.
**5.14** List the Applications of trees

**COURSE CONTENT**

**1. Introduction to Data Structures**

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

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

**2. Linear data structures-Linked Lists**

**Linked Lists** – Types - Singly Linked Lists – Create, insert, delete, sort, search and replace an element in a linked list – Singly Circular Linked Lists - Create, insert, delete, sort, search and replace an element in a linked list–Doubly Linked Lists – Create, insert, delete, sort, search and replace an element in a linked list, - Doubly Linked Lists – Create, insert, delete, sort, search and replace an element in a linked list.

**3. Linear data structures-Stacks**

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

**4. Linear data structures-Queues**

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

**5. Non-Linear data structures-Trees**

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

**REFERENCE BOOKS**

1. Data Structures: A Pseudocode Approach with C, Gilberg / Forouzan, Course technology Inc.

2. Data Structures using ‘C, Aaron m. Tanenbaum, Y Langsam and Augonstein (PHI).
3. Data structures through C, Yashwant Kanetkar, BPB Publications
4. An Introduction to data structures with applications, Tremblay & Sorenson, McGraw Hill Education
5. Data structures, Seymour Lipschitz, McGraw Hill Education.

## MODEL BLUE PRINT

| S.No. | Chapter/Unit title | No.of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO’s Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Introduction to Data structures, Sequential Storage Representation | 30 | 17 | 8 | 6 | 3 | * | 1 | 2 | 1 | * | CO1 |
| 2 | Linked Storage Representation-Linked Lists | 16 | 14 | 3 | 8 | 3 | * | 1 | 1 | 1 | * | CO2 |
| 3 | Linear Data Structures-Stacks | 14 | 14 | 3 | 3 | 8 | * | 1 | 1 | 1 | * | CO1, CO2, CO3 |
| 4 | Linear Data Structures-Queues | 10 | 11 | 3 | 8 | | * | 1 | 1 | | * | CO1, CO2, CO4 |
| 5 | Non-Linear Data Structures-Trees | 20 | 14 | 3 | 3 | 8 | * | 1 | 1 | 1 | * | CO1, CO2, CO5 |
| | **Total** | **90** | **70+10*** | **20** | **28** | **22** | **10*** | **5** | **6** | **4** | 1 | |

Note: Part-C: 10 marks single analytical question may be chosen from the chapters marked *.

**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 2.7 |
| Unit test-2 | From 3.1 to 5.14 |

**DBMS**

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| **CM-305** | **DBMS** | 6 | 90 | 20 | 80 |

| S.No. | Chapter/Unit Title | No.of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Concepts of DBMS & RDBMS | 18 | CO1 |
| 2. | Concepts of SQL | 22 | CO2 |
| 3. | Basics of PL/ SQL | 18 | CO3 |
| 4. | Advanced PL/SQL | 16 | CO4 |
| 5. | Concepts of NoSQL & MongoDB. | 16 | CO5 |
| Total Periods | | 90 | |

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

**Learning Outcomes:**
**At the end of the syllabus students should be able to**

**1.0 Concepts of DBMS &RDBMS**

1.1 Define Database Management System(DBMS)
1.2 List the advantages of DBMS
1.3 Explain Database Abstraction, Data Independence
1.4 Define Instances and Schemas
1.5 Explain Data Models.
1.6 Define Database languages DDL, DML, TCL
1.7 Explain Database Administrator, Users and Database System Architecture with diagram.
1.8 Define the terms Entity, Entity sets, Relationship, Relationship sets,
1.9 Explain Super Key, Candidate Key and Primary Key, Foreign Key
1.10 Explain Mapping Cardinalities.
1.11 List the symbols used in ER model.
1.12 Explain the Entity-Relationship Model.
1.13 Reduce the ER-diagrams to tables
1.14 Explain Generalization, Specialization &Aggregation.
1.15 Explain Function Dependencies, Normalizations– 1 NF, 2 NF and 3NF
1.16 Explain E.F.CODD's rules for RDBMS

## 2.0 Concepts of SQL

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

## 3.0 PL/SQL

3.1 Explain PL/SQL Block structure.
3.2 List the features of PL/SQL
3.3 Explain the data types of PL/SQL
3.4 Illustrate declarations and naming conventions of variables
3.5 Explain PL/SQL tables and user defined records.
3.6 Explain Input/Output statements.
3.7 Explain decision making statements with examples (IF... THEN,IF.THEN.ELSE,IF.HEN.ELSE.IF,CASE,GOTO)
3.8 Explain looping statements and illustrate (Simple loop, While loop, For loop).
3.9 Explain procedure with syntax and examples.
3.10 Explain function with syntax and examples.
3.11 Describe the advantages of subprograms.
3.12 Explain handling procedures with example programs.
3.13 Explain handling functions with example programs.
3.14 Explain the parameter modes in PL/SQL with examples (in, out and in out)
3.15 Define Recursion
3.16 Explain Recursion with example programs.

## 4.0 Advanced PL/SQL

4.1 Define cursor.
4.2 Classify cursors.

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

**5.0 Concepts of No SQL& Mongo DB**.

5.1 No SQL
- 5.1.1 Explain the classification of Databases: RDBMS, OLAP, NoSQL.
- 5.1.2 State the need of No SQL& its purpose
- 5.1.3 Compare RDBMS and No SQL
- 5.1.4 List the Advantages and Disadvantages of No SQL
- 5.1.5 Explain about the ACID and BASE system.
- 5.1.6 Compare ACID and BASE properties
- 5.1.7 Classify No SQL as Key-value stores, Column-oriented, Graph and Document oriented Databases.
- 5.1.8 Explain about Key-value stores Databases, Column-oriented Databases, Graph Databases, Document oriented Databases with examples.

5.2 Mongo DB
- 5.2.1 What is the purpose of mongoDB.
- 5.2.2 List the advantages of Mongo DB.
- 5.2.3 Explain the Creation, Dropping, Creation of Collection & Dropping of Collection of Database in Mongo DB
- 5.2.4 Explain the Data types of Mongo DB.
- 5.2.5 Explain Inserting Document, Query Document, Update Document, Deleting Document &Sorting Document with examples

**COURSE CONTENT**

## 1. Concepts of DBMS & RDBMS

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

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

## 2. Concepts of SQL

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

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

## 3. Basics of PL/SQL

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

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

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

## 4. Advanced PL/SQL

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

## 5. Concepts of No SQL& Mongo DB

Classification of Databases : RDBMS, OLAP, No SQL.-Introduction to No SQL- need for No SQL – Comparison of RDBMS and No SQL- Advantages and Disadvantages of NoSQL - BASE system – ACID System – Comparison of ACID and BASE properties – Classification of NoSQL as Key-value stores, Column-oriented, Graph and Document oriented Databases - Key-value stores Databases - Column-oriented Databases - Graph Databases - Document oriented Databases

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

**REFERENCE BOOKS**


1. Database System Concepts, Silberschatz, Henry F. Korth, S. Sudarshan - Mc Graw Hill Publications.
2. Oracle Database 11g: The Complete Reference, Kevin Loney-Oracle Press.
3. Fundamentals of Database Systems, Shamkant B. Navathe-Pearson
4. Understanding ORACLE, James T. Peary & Joseph G. Laseer-SybexInc.U.S..
5. RDBM with ORACLE, Rolland- Addison Wesley.
6. ORACLE series books of ORACLE Press– TMH.
7. Starting out with Oracle, Covering Databases, John Day &CraigVan-Dream Tech.
8. PL/SQL, Developer Tools & DBA, Slyke-Dreamtech.
9. www.nosql-database.org
10. www.mongodb.org


**MODEL BLUE PRINT**

| S.No. | Chapter/Unit title | No.of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Concepts of DBMS & RDBMS | 18 | 14 | 6 | 8 | | * | 2 | 1 | | * | CO1 |
| 2 | Concepts of SQL | 22 | 14 | 3 | 8 | 3 | | 2 | 1 | | | CO2 |
| 3 | Basics of PL/ SQL | 18 | 14 | 6 | 8 | | * | 2 | 1 | | * | CO3 |
| 4 | Advance PL/SQL | 16 | 14 | 6 | 8 | | * | 2 | 1 | | * | CO4 |
| 5 | Concepts of NoSQL & MongoDB. | 16 | 14 | 6 | 8 | | * | 2 | 1 | | * | CO5 |
| | **Total** | **90** | **70+(10*)** | **27** | **40** | **3** | **10*** | **10** | **5** | | **1** | |

Note: Part-C: 10 marks single analytical question may be chosen from any chapters marked with *.

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

| Unit Test | Learning outcomes to be covered |
|---|---|
| Unit test-1 | From 1.1 to 3.7 |
| Unit test-2 | From 3.8 to 5.2 |

## DIGITAL ELECTRONIS LAB

| Course Code | Course title | No of periods/week | Total no of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-306 | Digital Electronics lab | 3 | 45 | 40 | 60 |

| S No | Chapter/ Unit Title | No. of Periods | COs Mapped |
|---|---|---|---|
| 1 | Logic Gates | 10 | CO1<br>CO1 |
| 2 | Combinational logic circuits | 10 | CO2 |
| 3 | Sequential Logic Circuits | 15 | CO3 |
| 4 | Additional combination circuits | 10 | CO4 |
| | TOTAL | 45 | |

| | | | |
|---|---|---|---|
| **Course Outcomes** | Upon completion of the course the student shall be able to | | |
| | CO1 | CM-306.1 | Demonstrate the truth tables of logic gates |
| | CO2 | CM-306.2 | Design combinational logic circuits and verify truth tables. |
| | CO3 | CM-306.3 | Design Sequential logic circuits and verify with truth tables. |
| | CO4 | CM-306.4 | Construct Additional combinational circuits |

**LEARNING OUTCOMES:**

**Logic Gates**

1. Identification of Digital ICs and noting down pin details from data sheets. Identify the given digital ICs and draw the pin diagrams. (Use TTL and CMOS ICs of AND, OR, NOT, NAND, NOR and XOR gates with two and three inputs).
2. Verify the truth tables of AND, OR, NOT, NAND, NOR, XOR Gates.
3. Realize AND, OR, NOT, XOR gates using 2 input NAND and NOR Gates.
4. Verify DE Morgan's Laws using given digital trainer kit and given TTL gates.

**Combinational logic circuits**

5. Implement Half adder circuit using TTL/CMOS gates, and verify the truth tables.
6. Implement Full adder circuits using TTL/CMOS gates, and verify the truth tables.

7. Verify parallel adder using simulator software.
8. Verify the function of 4-bit magnitude comparator 7485 IC.

**Sequential Logic Circuits**

9. Verify the truth tables RS, JK, T and D Flip-flops.
10. Construct a ripple counter using JK-FFs and obtain its timing waveforms.
11. Verify the function of 7490 as decade and modulus counter, obtain timing waveforms.
12. verify the function of up/down counter using 74190/ 74193, change the modulus of the counter and verify.
13. To construct and verify the function of mod-16 Synchronous counters.
14. Verify the function of shift register (ICs like 7495, 74194 etc.).

**Additional Combinational logic circuits**

15. Verify the truth table of Multiplexer IC 74153.
16. Verify the truth table of BCD to 7 segment Decoder 7448 IC.
17. Verify the Truth table of 74148 Encoder & 74138 Decoder IC.

**Time Schedule:**

| Sl.No | Experiment Name | Allotted Periods |
|---|---|---|
| 1 | Identification of Digital ICs and noting down pin details from data sheets. Identify the given digital ICs and draw the pin diagrams. (Use TTL and CMOS ICs of AND, OR, NOT, NAND, NOR and XOR gates with two and three inputs). | 3 |
| 2 | Verify the truth tables of AND, OR, NOT, NAND, NOR, XOR Gates. | |
| 3 | Realize AND, OR, NOT, XOR gates using 2 input NAND and NOR Gates. | 3 |
| 4 | Verify DE Morgan's Laws using given digital trainer kit and given TTL gates. | 3 |
| 5 | Implement Half adder circuit using TTL/CMOS gates, and verify the truth tables. | 3 |
| 6 | Implement Full adder circuits using TTL/CMOS gates, and verify the truth tables. | |
| 7 | Verify parallel adder using simulator software. | 3 |
| 8 | Verify the function of 4-bit magnitude comparator 7485 IC. | 3 |
| 9 | Verify the truth tables RS, JK, T and D Flip-flops. | 3 |

| | | |
|---|---|---|
| 10 | Construct a ripple counter using JK-FFs and obtain its timing waveforms. | 3 |
| 11 | Verify the function of 7490 as decade and modulus counter, obtain timing waveforms. | 3 |
| 12 | verify the function of up/down counter using 74190/ 74193, change the modulus of the counter and verify. | 3 |
| 13 | To construct and verify the function of mod-16 Synchronous counters. | 3 |
| 14 | Verify the function of shift register (ICs like 7495, 74194 etc.). | 3 |
| 15 | Verify the truth table of Multiplexer IC 74153. | 3 |
| 16 | Verify the truth table of BCD to 7 segment Decoder 7448 IC. | 3 |
| 17 | Verify the Truth table of 74148 Encoder & 74138 Decoder IC. | 3 |

| **DIGITAL ELECTRONICS LAB OBJECTIVES AND KEY COMPETENCIES** | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| 1 | Identification of Digital ICs and noting down pin details from data sheets. Identify the given digital ICs and draw the pin diagrams. (Use TTL and CMOS ICs of AND, OR, NOT, NAND, NOR and XOR gates with two and three inputs). | Identify various ICs and their specification<br>a. OR gate<br>b. AND gate<br>c. NAND gate<br>d. NOR gate<br>e. XOR gate | ❖ Familiarization of ICs |
| 2 | Verify the truth tables of AND, OR, NOT, NAND, NOR, XOR Gates. | Use various inputs and identify the outputs of various gates<br>a. OR gate<br>b. AND gate<br>c. NAND gate<br>d. NOR gate<br>e. XOR gate | ❖ Verification of outputs as per the designated inputs for various gates<br>❖ Familiarization of ICs<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software |

| DIGITAL ELECTRONICS LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| | | | (or) Digital trainer kits |
| 3 | Realize AND, OR, NOT, XOR gates using 2 input NAND and NOR Gates. | Use NAND and NOR gates (known as the universal gate) implementation of :<br>a. AND using NAND<br>b. AND using NOR<br>c. OR using NAND<br>d. OR using NOR<br>e. NOT using NAND<br>f. NOT using NOR | ❖ Verification of outputs as per the designated inputs for combinatorial circuits.<br>❖ Familiarization of IC<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software<br>(or) Digital trainer kits |
| 4 | Verify DE Morgan's Laws using given digital trainer kit and given TTL gates. | I. Make the connections according to the circuit diagram.<br>II. Verify De-Morgan's theorem for two variables<br>III. Realize sum of product(SOP) and product of sum (POS) expressions<br>IV. Verify the truth table for different values. | ❖ Verification outputs as per the designated inputs for demorgan's theorem<br>❖ To verify POS and SOP<br>❖ To verify truth tables.<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software<br>(or) Digital trainer kits |
| 5 | Implement Half adder circuit using TTL/CMOS gates, and verify the truth tables. | I. Design, realize and verify the adder circuits using basic gates and universal gates.<br>II. Verify the truth table. | ❖ Verification of outputs as per the designated inputs for Half adder circuits as per truth table<br>❖ Understand TTL , CMOS families.<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software |

| DIGITAL ELECTRONICS LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| | | | (or) Digital trainer kits |
| 6 | Implement Full adder circuits using TTL/CMOS gates, and verify the truth tables. | I. Design, realize and verify the adder circuits using basic gates and universal gates.<br>II. Design, realize and verify full adder using two half adders.<br>III. Verify the truth table. | ❖ Verification of outputs as per the designated inputs for Full adder circuits as per truth table<br>❖ Understand TTL , CMOS families.<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software<br>(or) Digital trainer kits |
| 7 | Verify parallel adder using simulator software. | I. Make the connections as per the logic diagram.<br>II. Connect +5v and ground according to pin configuration.<br>III. Apply diff combinations of inputs to the i/p terminals.<br>IV. Note o/p for summation.<br>V. Verify the truth table. | ❖ Verification of outputs as per the designated inputs for Parallel adder circuits as per truth table<br>❖ Familiarization of IC 7483<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software<br>(or) Digital trainer kits |
| 8 | Verify the function of 4-bit magnitude comparator 7485 IC. | I. Make the connections according to the circuit diagram.<br>II. The output is high if both the inputs are equal.<br>III. Verify the truth table for different values. | ❖ Verification of outputs as per the designated inputs for 4-bit magnitude comparator circuits as per truth table<br>❖ Familiarization of IC 7485<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software<br>(or) Digital trainer kits |
| 9 | Verify the truth tables RS, JK, T and D Flip- | I. Connect the circuit<br>II. Apply VCC & ground signal to every IC. | ❖ Usage of various flipflops<br>❖ Usage of Bread boards<br>❖ Usage of connectors |

| DIGITAL ELECTRONICS LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| | flops. | III. Observe the input & output according to the truth table. | ❖ Usage of simulator software<br>(or) Digital trainer kits |
| 10 | Construct a ripple counter using JK-FFs and obtain its timing waveforms. | I. Connect the circuit<br>II. Apply VCC & ground signal to every IC.<br>III. Observe the input & output according to the truth table.<br>IV. Obtain the timing waveform | ❖ Verification of outputs of Ripple clunter<br>❖ Usage of JK FFs<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software<br>(or) Digital trainer kits |
| 11 | Verify the function of 7490 as decade and modulus counter, obtain timing waveforms. | I. Make the connections according to the circuit diagram.<br>II. Verify the truth table for different values.<br>III. Obtain the Timing waveform | ❖ Familiarization of IC 7490<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software<br>(or) Digital trainer kits |
| 12 | verify the function of up/down counter using 74190/ 74193, change the modulus of the counter and verify. | I. Connect the circuit.<br>II. Apply VCC & ground signal to every IC.<br>III. Observe the input & output according to the truth table. | ❖ Usage of IC 74190/74193<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software<br>❖ (or) Digital trainer kits |
| 13 | To construct and verify the function of mod-16 Synchronous counters. | I. Make the connections as per the logic diagram.<br>II. Connect VCC and ground according to pin configuration.<br>III. Apply diff combinations of inputs to the i/p terminals.<br>IV. Note o/p for summation.<br>V. Verify the truth table. | ❖ Implement mod-16 synchronous counter<br>❖ Understanding the propose of VCC and Ground.<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software<br>❖ (or) Digital trainer kits |
| 14 | Verify the function of shift register (ICs like | I. Make the connections according to the circuit | ❖ Implement shift register. |

| DIGITAL ELECTRONICS LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| | 7495, 74194 etc.). | diagram.<br>II. Verify the truth table for different values. | ❖ Demonstration usage d of ICs 7495,74194<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software<br>(Or) Digital trainer kits |
| 15 | Verify the truth table of Multiplexer IC 74153. | I. Fix the IC's on the bread board &give the input supply.<br>II. Make connection according to the circuit.<br>II. Give select signal and strobe signal at respective pins.<br>V. Connect +5 v VCC supply at pin no 24 & GND at pin no 12.<br>V. Verify the truth table for various inputs. | ❖ Implementing Multiplexers.<br>❖ Familiarization of IC 74153<br>❖ Usage of Bread boards<br>❖ Usage of connectors (or) Digital trainer kits |
| 16 | Verify the truth table of BCD to 7 segment Decoder 7448 IC. | III. Make the connections according to the circuit diagram.<br>IV. Verify the truth table for different values. | ❖ Implementing BCD 7 segment Decoder.<br>❖ Familiarization of IC 7448<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software<br>(Or) Digital trainer kits |
| 17 | Verify the Truth table of 74148 Encoder & 74138 Decoder IC. | I. Make the connections according to the circuit diagram.<br>II. Verify the truth table for different values. | ❖ Implementing Encoder and Decoder.<br>❖ Familiarization of IC 74148 &74138<br>❖ Usage of Bread boards<br>❖ Usage of connectors<br>❖ Usage of simulator software (or) Digital trainer kits |

| DIGITAL ELECTRONICS LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| | | | |

NOTE: 1) The student can implement above experiments either by using hardware components or by simulators to get acquaintance to various digital electronic experiments

2)Emphasis should be given to make use of IC trainers and bread boards to get acquainted with experience of using individual physical components at least for 50 percent of above experiments

## DATA STRUCTURES THROUGH C LAB

| Course Code | Course Title | No. of periods/week | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| **CM-307** | **Data Structures Through C Lab** | 6 | 90 | 40 | 60 |

| S.No. | Chapter/Unit Title | No.of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Introduction to Data structures Sequential Storage Representation | 24 | CO1 |
| 2. | Linked Storage Representation-Linked Lists | 24 | CO2 |
| 3. | Linear Data Structures-Stacks | 15 | CO1, CO2, CO3 |
| 4. | Linear Data Structures-Queues | 18 | CO1, CO2, CO4 |
| 5. | Non-Linear Data Structures-Trees | 9 | CO1, CO2, CO5 |
| | **Total Periods** | **90** | |

| | | | |
|---|---|---|---|
| **Course Outcomes** | Upon completion of the course the student shall be able to | | |
| | CO1 | CM-307.1 | Execute C programs on sorting and searching techniques |
| | CO2 | CM-307.2 | Develop C programs on the various Linked Lists operations. |
| | CO3 | CM-307.3 | Design C programs on the operations of Stack data structure |
| | CO4 | CM-307.4 | Execute C programs on the operations of Queue data structure |
| | CO5 | CM-307.5 | Write C programs on the operations of Binary Trees |

**Learning out comes:**

**Write C Program to Implement**

1. BUBBLE SORTING using Functions.
2. SELECTION SORTING using Functions.
3. INSERTION SORTING using Functions.
4. MERGE SORTING on two sorted list using Functions.
5. QUICK SORTING using Functions.

6. LINEAR SEARCHING using Functions.
7. BINARY SEARCHING with-out RECURSION.
8. BINARY SEARCHING with RECURSION.
9. SINGLY LINKED LIST with insert, delete, display, sort, find and replace operations.
10. SINGLY CIRCULAR LINKED LIST with insert, delete, display, sort, find and replace operations.
11. DOUBLY LINKED LIST with insert, delete, display, sort, find and replace operations.
12. DOUBLY CIRCULAR LINKED LIST with insert, delete, display, sort, find and replace operations
13. STACK with insertion, deletion and display operations using arrays.
14. STACK with insertion, deletion and display operations using linked lists.
15. Conversion of arithmetic expression to post-fix expression using STACKS.
16. Evaluation of post-fix expression using STACKS.
17. QUEUES with insertion, deletion and display operations using arrays.
18. QUEUES with insertion, deletion and display operations using linked lists.
19. CIRCULAR QUEUE with insertion, deletion and display operations using arrays.
20. CIRCULAR QUEUE with insertion, deletion and display operations using Linked List.
21. BINARY SEARCH TREE with insertion, deletion, various traversals and search operations.

**Time Schedule:**

| Sl.No | Experiment Name | Allotted Periods |
|---|---|---|
| 1 | BUBBLE SORTING using Functions. | 3 |
| 2 | SELECTION SORTING using Functions. | 3 |
| 3 | INSERTION SORTING using Functions. | 3 |
| 4 | MERGE SORTING on two sorted list using Functions. | 3 |
| 5 | QUICK SORTING using Functions. | 3 |
| 6 | LINEAR SEARCHING using Functions. | 3 |
| 7 | BINARY SEARCHING with-out RECURSION. | 3 |
| 8 | BINARY SEARCHING with RECURSION. | 3 |

| | | |
|---|---|---|
| 9 | SINGLY LINKED LIST with insert, delete, display, sort, find and replace operations. | 6 |
| 10 | SINGLY CIRCULAR LINKED LIST with insert, delete, display, sort, find and replace operations. | 6 |
| 11 | DOUBLY LINKED LIST with insert, delete, display, sort, find and replace operations. | 6 |
| 12 | DOUBLY CIRCULAR LINKED LIST with insert, delete, display, sort, find and replace operations | 6 |
| 13 | STACK with insertion, deletion and display operations using arrays. | 3 |
| 14 | STACK with insertion, deletion and display operations using linked lists. | 6 |
| 15 | Conversion of arithmetic expression to post-fix expression using STACKS. | 3 |
| 16 | Evaluation of post-fix expression using STACKS. | 3 |
| 17 | QUEUES with insertion, deletion and display operations using arrays. | 3 |
| 18 | QUEUES with insertion, deletion and display operations using linked lists. | 6 |
| 19 | CIRCULAR QUEUE with insertion, deletion and display operations using arrays. | 3 |
| 20 | CIRCULAR QUEUE with insertion, deletion and display operations using Linked List. | 6 |
| 21 | BINARY SEARCH TREE with insertion, deletion, various traversals and search operations. | 9 |

| **DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES** | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| 1 | Exercise on bubble sort | Write a C program for<br>i. Implementing Bubble sort<br>ii. Printing the list after every pass<br>iii. Printing the list after Bubble sort is performed | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Observe whether Bubble sort algorithm is properly implemented<br>❖ Check whether the sorted list is generated after the Bubble sort is performed for the given unordered list<br>❖ Check the efficiency of the program if the given list is almost sorted |

| DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| 2 | Exercise on Selection sort | Write a C program for<br>i. Implementing selection sort<br>ii. Printing the list after every pass<br>iii. Printing the list after selection sort is performed | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Observe whether selection sort algorithm is properly implemented<br>❖ Check whether the sorted list is generated after the selection sort is performed for the given unordered list |
| 3 | Exercise on insertion sort | Write a C program for<br>i. Implementing insertion sort<br>ii. Printing the list after every pass<br>iii. Printing the list after insertion sort is performed | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Observe whether insertion sort algorithm is properly implemented<br>❖ Check whether the sorted list is generated after the insertion sort is performed for the given unordered list |
| 4 | Implement a program for merge sort on two sorted lists of elements | Write a C program for<br>i. Implementing merge sort<br>ii. Printing the list after every pass<br>iii. Printing the list after merge sort is performed | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Check whether two separate sorted lists are properly stored in separate arrays<br>❖ Observe whether Merge sort algorithm is properly implemented<br>❖ Check whether the sorted list is generated after the Merge sort is performed for the given two separate lists |
| 5 | Exercise on Quick sort | Write a C program for<br>i. Implementing Quick sort<br>ii. Printing the list after every pass<br>iii. Printing the list after Quick sort is performed | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Observe whether Quick sort algorithm is properly implemented<br>❖ Check whether the sorted list is generated after the Quick sort is performed |

| DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| | | | for the given unordered list<br>❖ Check the efficiency of the program if the given list is almost sorted |
| 6 | Exercises on linear search | Write a C program for<br>i. Implementing Linear Search<br>ii. Print the proper result for successful and unsuccessful search | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Check whether Linear Search algorithm is properly implemented<br>❖ Observe the result for the search element is present in the list<br>❖ Observe the result for the search element is not present in the list |
| 7 | Exercise on binary search with-out Recursion | Write a C program for<br>i. Implementing Binary Search<br>ii. Print the proper result for successful and unsuccessful Binary search | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Check whether Binary Search algorithm is properly implemented<br>❖ Observe the result for the search element is present in the list<br>❖ Observe the result for the search element is not present in the list |
| 8 | Exercise on binary search with Recursion | Write a C program for<br>I. Implementing Binary Search<br>II. Print the proper result for successful and unsuccessful Binary search | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Check whether Binary Search algorithm is properly implemented<br>❖ Observe the Base Condition<br>❖ Observe the intermediate results in stack<br>❖ Observe the result for the search element is present in the list |

| DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| | | | ❖ Observe the result for the search element is not present in the list |
| 9 | Exercises on creation, insertion, deletion, display, sorting, find and replace of elements in a singly linked list | Write a C program for<br>I. Creation of linked list<br>II. Inserting an element in Linked list<br>III. Check for deletion of a node if no element is present and print error message<br>IV. Delete an element from the Linked list<br>V. Display all the elements from the linked list<br>VI. Sorting of elements<br>VII. Find and replace of element | ❖ Rectify syntactical errors<br>❖ Debug logical errors<br>❖ Study node structure<br>❖ Validate whether the memory allocation is done for the node<br>❖ Confirm whether the addition of node is done at the end<br>❖ Correct if deletion of an element in an empty list<br>❖ Confirm whether deletion of required node is done<br>❖ Observe whether all the elements of the linked list are displayed in proper order<br>❖ Observe whether all the elements of the linked list are sorted in proper order<br>❖ Observe whether find and replace of element in the linked list |
| 10 | Exercises on creation, insertion, deletion, display, sorting, find and replace of elements in a singly circular linked lists | Write a C program for<br>I. Creation of linked list<br>II. Inserting an element in Linked list<br>III. Check for deletion of a node if no element is present and print error message<br>IV. Delete an element from the Linked list<br>V. Display all the elements from the linked list<br>VI. Sorting of elements<br>VII. Find and replace of element | ❖ Rectify syntactical errors<br>❖ Debug logical errors<br>❖ Study node structure<br>❖ Validate whether the memory allocation is done for the node<br>❖ Confirm whether the addition of node is done at the end<br>❖ Correct if deletion of an element in an empty list<br>❖ Confirm whether deletion of required node is done<br>❖ Observe whether all the elements of the linked list are displayed in proper order |

| DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| | | | ❖ Observe whether all the elements of the linked list are sorted in proper order<br>❖ Observe whether find and replace of element in the linked list |
| 11 | Exercises on creation, insertion, deletion, display, sorting, find and replace of elements in a Double linked lists | Write a C program for<br>I. Creation of linked list<br>II. Inserting an element in Linked list<br>III. Check for deletion of a node if no element is present and print error message<br>IV. Delete an element from the Linked list<br>V. Display all the elements from the linked list<br>VI. Sorting of elements<br>VII. Find and replace of element | ❖ Rectify syntactical errors<br>❖ Debug logical errors<br>❖ Study node structure<br>❖ Validate whether the memory allocation is done for the node<br>❖ Confirm whether the addition of node is done at the end<br>❖ Correct if deletion of an element in an empty list<br>❖ Confirm whether deletion of required node is done<br>❖ Observe whether all the elements of the linked list are displayed in proper order<br>❖ Observe whether all the elements of the linked list are sorted in proper order<br>❖ Observe whether find and replace of element in the linked list |
| 12 | Exercises on creation, insertion, deletion, display, sorting, find and replace of elements in a doubly circular linked lists | Write a C program for<br>I. Creation of linked list<br>II. Inserting an element in Linked list<br>III. Check for deletion of a node if no element is present and print error message<br>IV. Delete an element from the Linked list<br>V. Display all the elements from the linked list<br>VI. Sorting of elements<br>VII. Find and replace of element | ❖ Rectify syntactical errors<br>❖ Debug logical errors<br>❖ Study node structure<br>❖ Validate whether the memory allocation is done for the node<br>❖ Confirm whether the addition of node is done at the end<br>❖ Correct if deletion of an element in an empty list<br>❖ Confirm whether deletion of required node is done<br>❖ Observe whether all the elements of the linked list are displayed in proper |

| DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| | | | order<br>❖ Observe whether all the elements of the linked list are sorted in proper order<br>❖ Observe whether find and replace of element in the linked list |
| 13 | Write a program to Implement a stack using Arrays. | Write a C program for<br>i. Creation of Stack consisting of elements using arrays<br>ii. Insertion of new element is done by push() function call<br>iii. Deletion of last element is done by pop() function call<br>iv. Print error message for 'empty stack' if no elements are present for pop() function call<br>v. Print error message for 'stack full' if number of elements exceed size of Stack array | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Observe declaration of stack using arrays<br>❖ Validate whether a new element is inserted at the top by push() function call<br>❖ Check whether only the top element is deleted by pop() function call<br>❖ Verify for empty stack condition in pop()<br>❖ Verify for stack full condition in push() |
| 14 | Write a program to Implement a stack using Linked List | Write a C program for<br>i. Creation of Stack consisting of elements using Linked List<br>ii. Insertion of new element is done by push() function call<br>iii. Deletion of last element is done by pop() function call<br>iv. Print error message for 'empty stack' if no elements are present for pop() function call | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Study node structure<br>❖ Validate whether the memory allocation is done for the node<br>❖ Observe declaration of stack using Linked List<br>❖ Validate whether a new element is inserted at the top by push() function call<br>❖ Check whether only the top element is deleted by pop() function call<br>❖ Verify for empty stack condition in pop() |
| 15 | Write a program for conversion of | Write a C program for<br>VI. Conversion of infix expression into postfix | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Observe declaration of stack using arrays |

| DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| | given infix arithmetic expression into postfix expression using Stack. | expression using stacks concept<br>III. Printing the postfix expression | ❖ Check whether the final expression is postfix expression or not. |
| 16 | Write a program for Evaluation of post-fix expression using Stack. | Write a C program for<br>i. Evaluation of post-fix expression using Stack.<br>ii. Printing the evaluated result | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Observe declaration of stack using arrays<br>❖ Check whether the result is correctly evaluated or not. |
| 17 | Write a program to implement a queue using arrays | Write a C program for<br>i. Creation of Queue consisting of elements using arrays<br>ii. Insertion of new element is done by insert method.<br>iii. Print error message for 'empty queue' if no elements are present for deletion of an empty queue.<br>iv. Print error message for 'queue full' if number of elements exceed size of Queue array upon insertion of new element.<br>v. Deletion of first element is done by delete method. | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Observe declaration of Queue using arrays<br>❖ Validate whether a new element is inserted at the end of the array by insert method.<br>❖ Verify for empty Queue condition for deletion of an element<br>❖ Verify for Queue full condition upon insertion of a new element<br>❖ Check whether only the first element is deleted by delete method. |
| 18 | Write a program to implement a queue using linkedlist | Write a C program for<br>i. Creation of Queue consisting of elements using Linked List<br>ii. Insertion of new element is done by insert method.<br>iii. Print error message for 'empty queue' if no elements are present for | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Study node structure<br>❖ Validate whether the memory allocation is done for the node<br>❖ Validate whether a new element is inserted at the end of the Linked List by insert method. |

| DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| | | deletion of an empty queue.<br>iv. Deletion of first element is done by delete method. | ❖ Verify for empty Queue condition for deletion of an element<br>❖ Check whether only the first element is deleted by delete method. |
| 19 | Write a program to implement a circular queue using arrays | Write a C program for<br>i. Creation of circular Queue consisting of elements using arrays<br>ii. Insertion of new element is done by insert method.<br>iii. Print error message for 'empty queue' if no elements are present for deletion of an empty queue.<br>iv. Print error message for 'queue full' if number of elements exceed size of Queue array upon insertion of new element.<br>v. Deletion of first element is done by delete at the front end | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Observe declaration of circular Queue using arrays<br>❖ Validate whether a new element is inserted at the rear end of the array by insert method.<br>❖ Verify for empty Queue condition for deletion of an element<br>❖ Verify for Queue full condition upon insertion of a new element<br>❖ Check whether only the first element is deleted by delete at the front end |
| 20 | Write a program to implement a circular queue using LinkedLists | Write a C program for<br>i. Creation of circular Queue consisting of elements using Linked List<br>ii. Insertion of new element is done by insert method.<br>iii. Print error message for 'empty queue' if no elements are present for deletion of an empty queue.<br>iv. Deletion of first element is done by delete at the front end | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Study node structure<br>❖ Validate whether the memory allocation is done for the node<br>❖ Observe declaration of circular Queue using Linked List<br>❖ Validate whether a new element is inserted at the rear end of the Linked List by delete method.<br>❖ Verify for empty Queue condition for deletion of an element<br>❖ Check whether only the first element is deleted by delete at the front end |

| DATA STRUCTURES LAB OBJECTIVES AND KEY COMPETENCIES | | | |
|---|---|---|---|
| **Sl.No** | **Name of the Experiment** | **Objectives** | **Key Competencies** |
| | | | |
| 21 | Write a C program to BINARY SEARCH TREE with insertion, deletion, various traversals and search operations. | Write a C program for<br>i. Creation of Binary Trees<br>ii. Insertion of a node<br>iii. Deletion of a node<br>iv. Perform In-order Traversal of the binary tree<br>v. Perform Pre-order Traversal of the binary tree<br>vi. Perform Post-order Traversal of the binary tree | ❖ Correct syntactical errors<br>❖ Debug logical errors<br>❖ Observe proper definition of elements in a Binary Search Tree<br>❖ Check whether the node is properly inserted in the Binary Tree<br>❖ Check whether the node is properly deleted in the Binary Tree<br>❖ Observe the root node after deleting root node element<br>❖ Validate whether the Tree in-order traversal is properly done<br>❖ Validate whether the Tree pre-order traversal is properly done |

## DBMS LAB

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

| S.No. | Chapter/Unit Title | No. of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Concepts of DBMS & RDBMS | 8 | CO1 |
| 2. | Concepts of SQL | 16 | CO2 |
| 3. | Basics of PL/ SQL | 12 | CO3 |
| 4. | Advance PL/SQL | 16 | CO4 |
| 5. | Concepts of NoSQL & MongoDB. | 8 | CO5 |
| | Total Periods | 60 | |

| | | | |
|---|---|---|---|
| **Course Outcomes** | Upon completion of the course the student shall be able to | | |
| | CO1 | CM-308.1 | Develop SQL Queries to Create, modify and drop tables and Queries to Insert, update, delete data from tables. |
| | CO2 | CM-308.2 | Execute SQL Queries to display data on different conditions from different tables |
| | CO3 | CM-308.3 | Execute PL/SQL Programs |
| | CO4 | CM-308.4 | Demonstrate the usage of cursors and triggers |
| | CO5 | CM-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 PL/SQL exception handling

17 Exercise on Procedures
18 Exercise on Functions
19 Exercise on Recursion
20 Exercise on Cursors
21 Exercise on Triggers
22 Exercise on Installation of Mongo DB
23 Exercise on Creation and Dropping of Database
24 Exercise on Creation and Dropping of Collections.
25 Exercise on Commands of Mongo DB- Insert, update, find, delete and sorting of Documents.

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

**Time Schedule:**

| Sl. No | Name of the Experiment | Periods |
|---|---|---|
| 1 | Know installation of Oracle | 1 |
| 2 | Exercise on creating tables. | 1 |
| 3 | Exercise on inserting records | 1 |
| 4 | Exercise on updating records | 1 |
| 5 | Exercise on modifying the structure of the table | 1 |
| 6 | Exercise on SELECT command | 2 |
| 7 | Exercise on querying the table using clauses like WHERE, ORDER, IN,AND, OR,NOT, IS NULL | 18 |
| 8 | Exercise on GROUP BY, HAVING | 2 |
| 9 | Exercise on Number functions, character functions, conversion functions and date functions, group functions | 3 |
| 10 | Exercise on SET operators | 2 |
| 11 | Exercise on sub queries | 3 |
| 12 | Exercise on Joins | 3 |
| 13 | Exercise on various date and number format models | 1 |
| 14 | Exercise on creating tables with integrity constraints | 1 |
| 14 | Write programs using PL/SQL control statements | 6 |
| 15 | Exercise on PL/SQL built-in exception handling | 2 |
| 16 | Exercise on PL/SQL in user defined exception handling | 2 |
| 17 | Exercise on Procedures | 2 |
| 18 | Exercise on Functions | 1 |
| 19 | Exercise on Recursion | 1 |
| 20 | Exercise on Cursors | 1 |

| Sl. No | Name of the Experiment | Periods |
|---|---|---|
| 21 | Exercise on Triggers | 1 |
| 22 | Exercise on Installation of Mongo DB | 1 |
| 23 | Exercise on Creation and Dropping of Database | 1 |
| 24 | Exercise on Creation and Dropping of Collections | 1 |
| 25 | Exercises on commands of Mongo DB | 1 |
| Total | | 60 |

**KEY COMPETENCIES**

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

| Sl. No | Name of the Experiment | Objectives | Key Competencies |
|---|---|---|---|
| 3 | Exercise on inserting records | Perform the following:<br>i. Check for the required table present already<br>ii. To insert the records correctly<br>iii. To display the records correctly | ❖ Correct syntax errors for Insertion of record<br>❖ Check for insertion of proper values for the required fields<br>❖ Verify the correct values pertaining to the record are inserted in the required table<br>❖ Check for displaying of the records correctly |
| 4 | Exercise on updating records | Perform the following:<br>i. Check for the required table present already<br>ii. To update the records correctly<br>iii. To display the updated records | ❖ Correct syntax errors for updating of record<br>❖ Check for updating<br>❖ Check for displaying of the updated records correctly |
| 5 | Exercise on modifying the structure of the table | Perform the following<br>i. To identify the required table, present in the system already<br>ii. To add new column<br>iii. To display the records correctly | ❖ Correct syntax errors in modifying the structure of the table<br>❖ Check whether required field is newly added to the existing table<br>❖ Check for displaying of the modified table correctly |
| 6 | Exercise on SELECT command | Perform the following<br>i. To identify the required table, present already<br>ii. To display the records in the required table | ❖ Check for syntax error in usage of Select command<br>❖ Check whether Select command is given correctly to display all the records |

| Sl. No | Name of the Experiment | Objectives | Key Competencies |
|---|---|---|---|
| 7 | Exercise on querying the table using clauses like WHERE, ORDER, IN,AND, OR,NOT, IS NULL | Perform the following:<br>i. To use the Select command<br>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<br>❖ Check whether Select command along with appropriate clause is given correctly for the required condition<br>❖ 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:<br>i. To use the Select command<br>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<br>❖ Check for usage of GROUP BY, HAVING<br>❖ Verify output values based on certain condition on few records |
| 9 | Exercise on Number functions, character functions, conversion functions and date functions, group functions | Perform the following<br>i. To use functions<br>ii. To use set command along with WHERE condition, GROUP BY, HAVING | ❖ Check for syntax error of various functions<br>❖ Check for usage of various functions<br>❖ Verify output values based on certain condition on few records |
| 10 | Exercise on SET operators | Perform the following<br>iii. To use set command<br>iv. To use set command along with WHERE condition | ❖ Check for syntax error in the usage of SET command<br>❖ Check for usage of SET command for updating<br>values based on certain condition on few records |

| Sl. No | Name of the Experiment | Objectives | Key Competencies |
|---|---|---|---|
| 11 | Exercise on sub queries | Perform the following<br>i. To use Select command<br>ii. To use appropriate Operators IN | ❖ Check for the syntax error in usage of sub queries<br>❖ Check for the correctness of the usage of appropriate operators used |
| 12 | Exercise on Joins | Perform the following<br>i. To create two tables<br>ii. To use the common field if two tables aroused<br>iii. To know different types of Joins | ❖ Check for the correctness of the syntax used for joining<br>❖ Check if the join is created between two tables<br>❖ Check if self-join is created |
| 13 | Exercise on various date and number format models | Perform the following:<br>i. To use date formats correctly<br>ii. To use number formats correctly | ❖ Check for the syntax of the date formats<br>❖ Check for the syntax of the number formats |
| 14 | Exercise on creating tables with integrity constraints | Perform the following<br>i. Create Primary key<br>ii. Create Foreign key or referential integrity constraint<br>iii. Create NOT NULL constraint<br>iv. Create UNIQUE Key constraint<br>v. Create CHECK constraint | ❖ Check for the syntax errors in usage of all types of Integrity constraints<br>❖ Check whether different types of Integrity constraints are used |
| 14 | Write programs using PL/SQL control statements | Perform the following<br>i. To use IF ... ELSE statements<br>ii. To use iterative statements<br>– Simple loop, While Loop, For Loop | ❖ Check for the syntax of IF... ELSE statements<br>❖ Check for the syntax of all iterative statements |

| Sl. No | Name of the Experiment | Objectives | Key Competencies |
|---|---|---|---|
| 15 | Exercise on PL/SQL built-in exception handling | Perform the following<br>i. Know about types of Exception handling<br>ii. To handle built-in Exceptions | ❖ Check for handling of built- in Exceptions<br>❖ Check for raising of user defined Exception<br>❖ Check for handling of user defined Exception with appropriate error messages |
| 16 | Exercise on PL/SQL in user defined exception handling | Perform the following<br>i. To declare user defined exception<br>ii. To raise user defined exception<br>iii. To handle user defined exception | ❖ Check for declaration of user defined exception<br>❖ Check for proper raising of exceptions<br>❖ Check for proper handling of user defined exception with appropriate error messages |
| 17 | Exercise on Procedures | Perform the following<br>i. To know the concept of stored procedures<br>ii. To declare procedures<br>iii. The type of parameters IN, IN OUT, OUT<br>iv. To call procedures from other procedures | ❖ Check for proper declaration of procedures<br>❖ Check for syntax<br>❖ Check for proper calling of procedures |
| 18 | Exercise on Functions | Perform the following<br>i. To know the concept of stored functions<br>ii. To declare function with return data<br>iii. To call functions from other functions | ❖ Check for proper declaration of function<br>❖ Check for syntax of parameters and its data type<br>❖ Check for proper return data type from the functions<br>❖ Check for variable assignment to get the returned value from the function |

| Sl. No | Name of the Experiment | Objectives | Key Competencies |
|---|---|---|---|
| 19 | Exercise on Recursion | Perform the following<br>i. To know the concept of stored functions and stored procedures<br>ii. To call the procedure and function by itself<br>iii. To place a condition to terminate from calling itself | ❖ Check for the syntax of stored function or procedure<br>❖ Check for calling the function or procedure in the same function / procedure<br>❖ Check for the condition to terminate from calling itself |
| 20 | Exercise on Cursors | Perform the following<br>i. To know the concept cursors<br>ii. To know the fetch data from database | ❖ Check for the syntax of cursor<br>❖ Check for open cursor, fetch data, close cursor<br>❖ Check for the result |
| 21 | Exercise on Triggers | Perform the following<br>i. To know the concept of triggers<br>ii. Validation before and after insert, before and after update and , before and after delete data | ❖ Check for the syntax of trigger<br>❖ Write a trigger which raises before insert data<br>❖ Raise trigger<br>❖ Repeat the procedure for remaining<br>❖ Check for the result |
| 22 | Exercise on Installation of Mongo DB | Perform the following<br>i. To download and install Mongo DB | ❖ Observe Mongo DB version being installed<br>❖ Observe the RAM & HDD requirements<br>❖ Rectify for any Mongo DB installation errors<br>Able to login as Administrator |

| Sl. No | Name of the Experiment | Objectives | Key Competencies |
|---|---|---|---|
| 23 | Exercise on Creation and Dropping of Database | Perform the following<br>i. Create the Database<br>ii. Drop the Database | ❖ Know the use of create Database () and drop Database()<br>❖ Correct Database creation syntax errors<br>❖ Check for displaying the database name |
| 24 | Exercise on Creation and Dropping of Collections | Perform the following<br>i. Create the Collection<br>ii. Drop the Collection | ❖ Know the use of create Collection () and drop ()<br>❖ Correct Database creation syntax errors<br>❖ Check for collection name<br>❖ Check for the collection dropped |
| 25 | Exercises on commands of Mongo DB | Execute the following commands of Mongo DB<br>i. Insert the Document<br>ii. update the Document<br>iii. find the Document<br>iv. Delete the Document<br>v. sort the Documents | ❖ Know the syntax of insert (), update (), find (), remove (), sort () functions.<br>❖ Correct syntax errors.<br>❖ Check out for different input values. |

## MULTI MEDIA LAB

| Course Code | Course Title | No. of periods/week | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-309 | Multimedia Lab | 4 | 60 | 40 | 60 |

| S.NO | MAJOR TOPICS | NO. OF PERIODS | CO's mapped |
|---|---|---|---|
| 1 | MS Access - create Database, create table with and without constraints, Insert, delete, update records, implement queries, create relationship between two tables | 12 | CO1 |
| 2 | Scribus/Page maker- Creation of publication using tools, text, shapes, etc, Custom template, colors, text block, Objects, Styles, Page elements, Printing the documents | 12 | CO2 |
| 3 | Telugu typing Software /Telugu Software– Anu Script Manager, Usage in SCRIBUS/ Page Maker., Key board acquaintance | 8 | CO3 |
| 4 | GIMP/Photoshop – Different tools, Working with Layers, Working with painting tools, Colors, Brushes | 16 | CO4 |
| 5 | Adobe Flash – Drawing Basic shapes, Working with layers, Working with Text , 3D spaces, Creating simple animations, Audio and video editing using audacity tool | 12 | CO5 |
| | **TOTAL** | **60** | |

| | | | |
|---|---|---|---|
| **Course Outcomes** | Upon completion of the course the student shall be able to | | |
| | CO1 | CM-309.1 | Demonstrate the concepts of databases, tables, manipulating records, queries and establishing relationship among tables. |
| | CO2 | CM-309.2 | Design publication files such as Textbooks, Visiting Cards, Invitation Cards, etc. using Adobe PageMaker |
| | CO3 | CM-309.3 | Use Telugu Typing software (Anu Script Manager) in SCRIBUS/ Adobe Page maker. |
| | CO4 | CM-309.4 | Use the Adobe GIMP/ Photoshop, Design and enhance the quality all types of picture files |
| | CO5 | CM-309.5 | Use Adobe Flash features to include multimedia animations through audio and visual effects. |

**Learning Outcomes:**

**Practice with MS-Access**

1. To create Database
2. To Create table with and without constraints
3. To Insert, delete, update records
4. To implement queries
5. To create relationship between two table

**Practice with Adobe SCRIBUS/ Page Maker.**

6. Exercise on Installation, invoking and familiarizing Adobe Page Maker.
7. Exercise on SCRIBUS/ Page Maker. Tools.
8. Exercise on pallets and formatting pages
9. Exercise on text formatting
10. Exercise on Advanced text formatting
11. Exercise on Graphics tools
12. Exercise on object transformations.
13. Exercise on color options.
14. Exercise on graphics with layers using photo shop plug-ins
15. Exercise on import and export options.
16. Exercise on creating visiting card
17. Exercise on creating book cover page
18. Exercise on creating hotel menu card
19. Exercise on creating invitation card
20. Exercise on creating brochure
21. Exercise on Anu script for preparing Visiting card, Brochure in telugu.
22. Exercise on Anu script for preparing telugu invitation card.

**Practice with Adobe *GIMP/ Photoshop.***

23. Exercise on Installation, invoking and familiarizing Adobe *GIMP/ Photoshop.*
24. Exercise on Images
25. Exercise on Resizing & Cropping Images
26. Exercise on Working With Basic Selections
27. Exercise on Layers
28. Exercise on Painting In *GIMP/ Photoshop.*
29. Exercise on Photo Retouching
30. Exercise on Color Correction
31. Exercise on Quick Mask Mode
32. Exercise on Pen Tool
33. Exercise on Creating Special Effects
34. Exercise on Exporting Your Work
35. Exercise on Logo Creation

**Practice with Adobe Flash**

36. Exercise on creating a new document, drawing basic shapes using pen, pencil, brush and eraser tools
37. Exercise on creating layers , naming layers, organizing layers in to folders.
38. Exercise on creating objects, fill, gradient , aligning and grouping of objects in to layers.
39. Exercise on Creating symbols and instances, creating frame by frame animation
    animating the text.

40. Exercise on creating motion tweening animation - classic tweening
41. Exercise on creating shape tweening and path tweening animations.
42. Exercise on creating onion skinning animation effects.
43. Exercise on Creating a spot light masking for text and image..
44. Exercise on creating a new audio file by editing the existing audio.

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

**KEY COMPETENCIES**

| Exp. No | Name of the Experiment | Objectives | Key Competencies |
|---|---|---|---|
| 1 | To create database | a. Open MS Access<br>b. Create database<br>c. save | atabase creatIon |
| 2 | To create table | a. Open MS Access<br>b. Create database<br>c. Create table<br>d. Use primary key | able creation |
| 3 | To insert/delete/update records into table | a. Open MS access<br>b. Create database<br>c. Crate table<br>d. Insert/delete/update records | ble to insert/upate/delete and delete and update records into the table |
| 4 | To implement queries | a. Open MS access<br>b. Create database<br>Crate table<br>c. Use Select command | ble to display contents of the table based on the user requirement |
| 5 | Create relationships between tables | a. Create table<br>b. Create one more tables<br>c. Insert records | ble to link tables |

| | | | |
|---|---|---|---|
| | | d. Use relationship option | |
| 6 | Exercise on Installation, invoking and familiarizing Adobe Page Maker. | Installation, invoking and familiarizing Adobe Page Maker. | ❖ Installing page maker<br>❖ Familiarize with pagemaker environment |
| 7 | Exercise on Page Maker Tools. | Page Maker Tools. | ❖ Using Tool box, zero position, pointer tool, text tool, rotate tool, crop tool, oblique line tool, constrained line tool, box tool, rectangle frame, circle tool, circular frame, polygon tool, polygon frame, hand tool and zoom tool, |
| 8 | Exercise on pallets and formatting pages | pallets and formatting pages | ❖ Use of paper size, page size, control pallet, color pallet, styles pallet, layers pallet, master page pallet, hyperlink pallet and measurement system, grids, rulers and guides, insert pages. |
| 9 | Exercise on text formatting | text formatting | ❖ Know the purpose of master pages, placing a text, Formatting text (size, styles), Paragraph setting, tab setting, bullets, numbering, hyphenation setting, setting and creating styles, rotating text and color to text and save the document. |
| 10 | Exercise on Advanced text formatting | Advanced text formatting | ❖ use spell check, divide the text intocolumns, work with indexes and pagenation, use the find feature and save |

| | | | |
|---|---|---|---|
| | | | the document. |
| 11 | Exercise on Graphics tools | Graphics tools | ❖ Create a document to work with graphics with the help of line tool, box tool, ellipse tool, polygon tool, rounded corners, fill, stroke and to place various graphics(at least 2 for each graphic tool) and save the document. |
| 12 | Exercise on object transformations. | object transformations. | ❖ Transform the objects such as transforming a rectangle, resizing an ellipse, inserting cropping an image. |
| 13 | Exercise on color options. | color options. | ❖ Adding color to a graphic shape, creating own colors with RGB, editing, copying, removing and replacing colors, grouping and ungrouping objects, linking objects, masking objects and save the document. |
| 14 | Exercise on graphics with layers using photoshop plug-ins | graphics with layers using photoshop plug-ins | ❖ Create a document of five pages containing text and graphics and work with layers, moving objects between layers using layer options, using stacking order, using photoshop plug-ins |
| 15 | Exercise on import and export options. | import and export options. | ❖ Create a new document and import text from HTML, MS word, spreadsheet, photo CD, acquiring tif image,managing linked files, to use export options to export text and |

| | | | |
|---|---|---|---|
| | | | graphics to jpeg format and to print the document, to publish the document in internet and save it, |
| 16 | Exercise on creating visiting card | creating visiting card | ❖ Create visiting card with text and graphics on both sides with proper formatting. |
| 17 | Exercise on creating book cover page | creating book cover page | ❖ Create front and back cover page of a book with text and graphics with proper formatting. |
| 18 | Exercise on creating hotel menu card | creating hotel menu card | ❖ Create a hotel menu card with text and graphics with proper formatting. |
| 19 | Exercise on creating invitation card | creating invitation card | ❖ Create a invitation card with text and graphics with proper formatting for required no. of pages. |
| 20 | Exercise on creating brochure | creating brochure | ❖ Create a brochure for the firms like real estate companies, hospitals, educational institutions etc.., |
| 21 | Exercise on Anuscript for preparing Visiting card, Brochure | Anuscript for preparing Visiting card, Brochure | ❖ Visiting card, Brochure preparation using Anuscript in Telugu |
| 22 | Exercise on Anuscript for preparing telugu invitation card. | Anuscript for preparing telugu invitation card. | ❖ Invitation card preparation using Anuscript in Telugu |
| 23 | Exercise on Installation, invoking and familiarizing Adobe Photoshop | Installation, invoking and familiarizing Adobe Photoshop | ❖ Exploring the Toolbox<br>❖ The New CS4 Applications Bar & the Options Bar<br>❖ Exploring Panels & Menus |

| | | | |
|---|---|---|---|
| | | | ❖ Creating & Viewing a New Document<br>❖ Customizing the Interface<br>❖ Setting Preferences |
| 24 | Exercise on Images | Working with Images | ❖ Zooming & Panning an Image<br>❖ Working with Multiple Images, Rulers, Guides & Grids<br>❖ Undoing Steps with History<br>❖ Adjusting Color with the New Adjustments Panel<br>❖ The New Masks Panel & Vibrance Color Correction Command<br>❖ The New Note Tool & the Save for Web & Devices Interface<br>❖ The New Auto-Blend & Auto-Align Layers Commands<br>❖ The New 3D Commands |
| 25 | Exercise on RESIZING & CROPPING IMAGES | RESIZING & CROPPING IMAGES | ❖ Understanding Pixels & Resolution<br>❖ The Image Size Command<br>❖ Interpolation Options<br>❖ Resizing for Print & Web<br>❖ Cropping & Straightening an Image<br>❖ Adjusting Canvas Size & Canvas Rotation |
| 26 | Exercise on WORKING WITH BASIC SELECTIONS | WORKING WITH BASIC SELECTIONS | ❖ Selecting with the Elliptical Marquee Tool<br>❖ Using the Magic Wand & Free Transform Tool<br>❖ Selecting with the Regular & Polygonal |

| | | | |
|---|---|---|---|
| | | | Lasso Tools<br>❖ Combining Selections<br>❖ Using the Magnetic Lasso Tool<br>❖ Using the Quick Selection Tool & Refine Edge<br>❖ Modifying Selections |
| 27 | Exercise on LAYERS | Working on Layers | ❖ Understanding the Background Layer<br>❖ Creating, Selecting, Linking & Deleting Layers<br>❖ Locking & Merging Layers<br>❖ Copying Layers, Using Perspective & Layer Styles<br>❖ Filling & Grouping Layers<br>❖ Introduction to Blending Modes<br>❖ Blending Modes, Opacity & Fill<br>❖ Creating & Modifying Text |
| 28 | Exercise on PAINTING IN PHOTOSHOP | PAINTING IN PHOTOSHOP | ❖ Using the Brush Tool<br>❖ Working with Colors & Swatches<br>❖ Creating & Using Gradients<br>❖ Creating & Working with Brushes<br>❖ Using the Pencil & Eraser Tools<br>❖ Painting with Selections |
| 29 | Exercise on PHOTO RETOUCHING | PHOTO RETOUCHING | ❖ Using The Red Eye Tool<br>❖ The Clone Stamp Tool<br>❖ The Patch Tool & the Healing Brush Tool<br>❖ The Spot Healing Brush Tool<br>❖ The Color Replacement Tool<br>❖ The Toning & Focus Tools<br>❖ Painting with History |

| | | | |
|---|---|---|---|
| 30 | Exercise on COLOR CORRECTION | COLOR CORRECTION | ❖ Using Color Spaces & Color Modes<br>❖ The Variations Command<br>❖ The Auto Commands<br>❖ Adjusting Levels<br>❖ Adjust Curves, Non-Destructively, with Adjustment Layers |
| 31 | Exercise on QUICK MASK MODE | Using QUICK MASK MODE | ❖ Using Quick Mask Options<br>❖ Painting a Selection<br>❖ Saving & Removing a Selection from the Background |
| 32 | Exercise on PEN TOOL | Working with the PEN TOOL | ❖ Understanding Paths & the Pen Tool<br>❖ Creating Straight & Curved Paths<br>❖ Creating Combo Paths<br>❖ Creating a Clipping Path |
| 33 | Exercise on CREATING SPECIAL EFFECTS | CREATING SPECIAL EFFECTS | ❖ Getting Started with Photoshop Filters<br>❖ Smart Filters<br>❖ Creating Text Effects<br>❖ Applying Gradients to Text |
| 34 | Exercise on Photo Shop Credits | EXPORTING YOUR WORK | ❖ Saving with Different File Formats<br>❖ Saving for Web & Devices<br>❖ Printing Options<br>❖ Photo shop Credits |
| 35 | Exercise on Logo Creation | Logo Creation | ❖ To apply all the tools<br>❖ Prepare college logo<br>❖ Prepare logo for industry |
| 36 | Exercise on creating a Flash Page | Creating flash document | ❖ Opening of flash interface<br>❖ Creating a new file<br>❖ Working with basic tools like pen, pencil, Brush and eraser tools<br>❖ Drawing basic shapes<br>❖ Save the file |
| 37 | Exercise on creating | Working with layers, naming | ❖ Creating basic |

| | | | |
|---|---|---|---|
| | Layers in Flash | and grouping, locking and unlocking layers. | shapes in different layers<br>❖ Grouping up of layers<br>❖ Locking and unlocking the layers<br>❖ Naming the layers<br>❖ Grouping the layers in to folders |
| 38 | Exercise on creating Objects | Working with objects | ❖ Creating different objects<br>❖ Working with fill, gradient features of objects<br>❖ Linking of objects to layers<br>❖ Aligning the objects.<br>❖ Save the file. |
| 39 | Exercise on Frame By Frame animation | Working with symbols and instances, working with timeline, frame by frame animation. | ❖ Creating symbols and instances<br>❖ Saving the symbols and instances<br>❖ Creating a text in a layer<br>❖ Animating the text using frame by frame animation<br>❖ Setting the time limit for animation<br>❖ Save the file. |
| 40 | Exercise on Motion Tweening | Creating a basic shape, moving the ball using motion tweening. | ❖ Creating a basic object like Ball<br>❖ Working with fill , gradient and texture for the object<br>❖ Moving the ball in direction using motion tweening |
| 41 | Exercise on Morphing, path tweening | import an object, working with shape tweening.<br><br>Creating a shape, working with guide layer. | ❖ Create / Import an object<br>❖ Attaching the object to layer<br>❖ Morph the object using shape tweening<br>❖ Ceate a basic shape like BEE<br>❖ Attach the shape to layer<br>❖ Creating a path and |

| | | | |
|---|---|---|---|
| | | | attaching to layer<br>❖ Playing the animation |
| 42 | Exercise on creating onion skinning animation effect | Learning the use of onion skinning feature in Flash | ❖ Creating any basic shape<br>❖ Working with time line feature<br>❖ Enabling onion skin feature<br>❖ Playing the animation |
| 43 | Exercise on Spot light masking | Creating an object,<br>Creating spotlight, Masking of the object, playing the animation | ❖ Create a text/object<br>❖ Creating spotlight for text/object<br>❖ Playing the animation |
| 44 | Exercise on creating new audio file | Importing an audio file<br>Clipping the audio<br>Saving and exporting the audio file. | ❖ Import an audio file<br>❖ Cut a small part of audio file using audacity tool<br>❖ Save the file |

# IV SEMESTER

**DIPLOMA IN COMPUTER ENGINEERING**
**SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2020**

**(IV Semester)**

| Sub Code | Name of the Subject | InstructionPeriods/Week | | Total Periods Per Semester | Scheme Of Examinations | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Practicals | | Duration (hrs) | Sessional Marks | End Exam Marks | Total Marks |
| **THEORY SUBJECTS** | | | | | | | | |
| CM-401 | Mathematics III | 3 | - | 45 | 3 | 20 | 80 | 100 |
| CM-402 | Web Technologies | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-403 | Computer Organization And Microprocessors | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-404 | OOP through C++ | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-405 | Computer Networks | 5 | - | 75 | 3 | 20 | 80 | 100 |
| **PRACTICAL SUBJECTS** | | | | | | | | |
| CM-406 | Web Technologies Lab | - | 6 | 90 | 3 | 40 | 60 | 100 |
| CM-407 | OOP through C++ Lab | - | 4 | 60 | 3 | 40 | 60 | 100 |
| CM-408 | Communication Skills | - | 3 | 45 | 3 | 40 | 60 | 100 |
| CM-409 | Computer Hardware & Network Maintenance Lab | - | 6 | 90 | 3 | 40 | 60 | 100 |
| | **Total** | **23** | **19** | **630** | **-** | **260** | **640** | **900** |

CM-401&408 common with all branches
CM-402,406, common with DIT branch
CM405 common with IT302

## ENGINEERING MATHEMATICS-III

| Course Code | Course Title | No. of Periods/week | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-401 | Engineering Mathematics-III | 3 | 45 | 20 | 80 |

| S.No. | Unit Title | No. of periods | COs mapped |
|---|---|---|---|
| 1 | Higher order Linear Differential equations with constant coefficients | 15 | CO1 |
| 2 | Laplace Transforms | 18 | CO2 |
| 3 | Fourier Series | 12 | CO3 |
| | Total Periods | 45 | |

| | | |
|---|---|---|
| ***Course Outcomes*** | Upon completion of the course the student shall be able to | |
| | CO1 | Solve homogeneous and non-homogeneous differential equations of second and higher order. |
| | CO2 | Find Laplace and inverse Laplace transforms of various functions. |
| | CO3 | Expand given functions as Fourier series and half- range Fourier Sine and Cosine series. |

## ENGINEERING MATHEMATICS – III

### Learning Outcomes

### Unit-I

### Differential Equations of higher order

**C.O. 1 Solve homogeneous and non-homogeneous differential equation of second and higher order.**

**L.O** 1.1 Solve Differential equations of the type $(aD^2 + bD + c)\ y = 0$ where a, b, c are real numbers and provide examples.

1.2 Solve higher order homogeneous differential equations with constant coefficients and provide examples.

1.3 Define complementary function, particular Integral and general solution of a non-homogeneous differential equation.

1.4 Describe the methods of solving *f(D) y = X* where *f(D)* is a polynomial of $n^{th}$ order and *X* is a function of the forms $k,\ e^{ax},\ \sin ax, \cos ax,\ x, x^n$ and their linear combinations where n is a positive integer, with examples.

## Unit-II

## Laplace Transforms

**C.O. 2 Find Laplace and inverse Laplace transforms of various functions.**

**L.O.** 2.1 Define Laplace Transform and explain the sufficient conditions of existence of Laplace Transform

2.2. Obtain Laplace transforms of standard functions and solve simple problems.

2.3 Write the properties of Laplace Transform – Linearity property, First shifting theorem (without proof) and Change of Scale property and solve simple problems.

2.4. Write the Laplace Transform of unit step function and second shifting theorem (without proof) and solve simple problems.

2.5. Write formulae for Laplace transform of functions with multiplication by $t^n$ and division by t, Laplace transform of derivatives, evaluation of some definite integrals using Laplace Transforms and solve simple problems.

Syllabus for Unit test-I completed

2.6 Define inverse Laplace Transform, obtain inverse Laplace Transforms of standard functions and solve simple problems.

2.7 Write linearity property, first and second shifting theorems (without proof), change of scale property of inverse Laplace transform and solve simple problems.

2.8 Write inverse Laplace transforms of derivatives and integrals and solve simple problems.

2.9 Write inverse Laplace transforms of functions with multiplication by s and division by s and solve simple problems.

2.10 Write inverse Laplace transforms of functions using partial fractions and solve some simple problems.

2.10 Define convolution of two functions, state convolution theorem (without proof) and solve simple problems.

## Unit-III

## Fourier series

**C.O. 3 Expand given functions as Fourier series and half- range Fourier Sine and Cosine series**

**L.O**. 3.1 Define the orthogonality of functions in an interval.

3.2 Define Fourier series of a function in the intervals $(c,\ c+2\pi)$ and $(c,\ c+2l)$ and write the Euler's formulae for determining the Fourier coefficients.

3.3 Write sufficient conditions for the existence of Fourier series expansion of a function.

3.4 Find Fourier series of simple functions in the range (0 , 2π) and (-π , π)

3.5 Write Fourier series for even and odd functions in the interval $(-\pi,\ \pi)$ and $(-l, l)$ expand simple functions.

3.6 Write Fourier series expansion of a function over the interval (0, 2l) and $(-l,\ l)$ and expand simple functions.

3.7 Write half-range Fourier sine and cosine series of a function over the interval (0, π) and $(0,\ l)$ and expand simple functions.

Syllabus for Unit test-II completed

## ENGINEERING MATHEMATICS – III
## (Common Subject)
## Course Content

**Unit I: Differential Equations of higher order**

1. Solve Homogenous linear differential equations with constant coefficients of order two and higher with emphasis on second order.
2. Solve Non-homogenous linear differential equations with constant coefficients of the form f(D)y = X where X is in the form k(constant), $e^{ax}$, sinax, cosax, $x^n$, where n is a positive integer, finding complimentary function, particular integral and general solution.

**Unit II: Laplace Transforms**

3. Definition, sufficient conditions for existence of LT, LT of elementary functions, linearity property, state first shifting theorem, change of scale property, multiplication by $t^n$, division by t, LT of derivatives and integrals, LT of unit step function, state second shifting theorem, inverse Laplace transforms- state shifting theorems and change of scale property, multiplication by $s^n$ and division by s, derivatives, integrals, examples of inverse LT using partial fractions, state convolution theorem with simple examples.

**Unit III: Fourier series**

4. Orthogonality of trigonometric functions, Representation of a function in Fourier series over the interval $(c\ ,\ c+2\pi)$ and $(c\ ,\ c+2l)$, Euler's formulae , sufficient conditions for existence of Fourier series expansion of a function, Fourier series expansion of basic functions limited to k(constant), $x, x^2, \sin ax, \cos ax, e^{ax}$ and their combinations over the intervals $(0,\ 2\pi), (-\pi, \pi), (0,\ 2l), (-l, l)$ , Fourier series for even and odd functions over $(-\pi, \pi)$ and $(-l, l)$, Fourier half-range sine and cosine series over $(0,\ \pi)$ and $(0,\ l)$

**Textbook:**

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

**Reference Books:**


1. B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers
2. M.R. Spiegel, Schaum's Outline of Laplace Transforms, Schaums' Series
3. M.Vygodsky, Mathematical Handbook: Higher Mathematics, Mir Publishers, Moscow.

**MODEL BLUE PRINT**

| S. No | Chapter/ Unit title | No of Periods | Weightage Allotted | Marks wise distribution of weightage | | | | Question wise distribution of weightage | | | | COs mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| **1** | Unit – I Higher order Linear Differential equations with constant coefficients | 15 | 28 | 11 | 11 | 3 | 3 | 2 | 2 | 1 | 1 | CO1 |
| **2** | Unit - II Laplace Transforms | 18 | 33 | 11 | 11 | 11 | 0 | 2 | 2 | 2 | 0 | CO2 |
| **3** | Unit - III Fourier Series | 12 | 19 | 3 | 3 | 3 | 10 | 1 | 1 | 1 | 1 | CO3 |
| **Total** | | **45** | **80** | **25** | **25** | **17** | **13** | **5** | **5** | **4** | **2** | |

**R: Remembering Type : 25 Marks**
**U: understanding Type : 25 Marks**
**Ap: Application Type : 17 Marks**
**An: Analysing Type : 13 Marks**

**C-20**
**Engineering Mathematics – III**
**Unit Test Syllabus**

| Unit Test | Learning Outcomes to be Covered |
|---|---|
| **Unit Test-I** | From LO 1.1 to 2.5 |
| **Unit Test-II** | From LO 2.6 to 3.7 |

**WEB TECHNOLOGIES**

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

| S. No. | Chapter/Unit Title | No. of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Principles of Web Designing and HTML Introduction. | 12 | CO1 |
| 2. | Understand various HTML tags and usage of style sheets. | 14 | CO2 |

| | | | |
|---|---|---|---|
| 3. | Understand XML and Client side scripting using Java Script. | 14 | CO3 |
| 4. | JavaScript Ajax and J Query | 15 | CO4 |
| 5. | Web servers and<br>Server side scripting using PHP | 20 | CO5 |
| | **Total Periods** | **75** | |

| | | | |
|---|---|---|---|
| **Course Outcomes** | Upon completion of the course the student shall be able to | | |
| | CO1 | CM-402.1 | Design interactive web page(s) using HTML |
| | CO2 | CM-402.2 | Describe the process to format and validate Web page elements using CSS. |
| | CO3 | CM-402.3 | Describe data in a web page using XML and JavaScript |
| | CO4 | CM-402.4 | Use AJAX, JQuery and Angular JS in web page design. |
| | CO5 | CM-402.5 | Develop Dynamic web site using server side PHP Programming and database connectivity is using PHP. |

**Learning Outcomes:**

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

1.2 Basic web Terminology.
1.3 Describe Anatomy of web page.
1.4 Understand different Web page elements.
1.5 Navigate through web pages
1.6 Narrate steps in building web site
1.7 Narrate steps in launching
1.8 Narrate maintaining web site.
1.9 Introduction and Overview of HTML
1.10 Discuss the rules for designing a HTML document.
1.11 Explain the structure of HTML document.
1.12 Define HTML element and Attribute.
1.13 Study the basic tags in HTML <html>, <head>, <title>, <body>.
1.14 Study the header tags <h1> to <h6>
1.15 Discuss the formatting tags <b>, <i>, <u>, <strike>, <sub>, <sup>, big>, <small>, <tt>
1.16 Discuss the Logical formatting tags <q>, , <cite>, <<ins>, <del>,
1.17 Discuss the <marquee> with attributes.
1.18 List Character entities.
1.19 Explain the List tags like <ul>, <ol>, <li>, <dl>, <menu> with attributes.
1.20 Describe tables tags like <table>, <tr>, <td>, <th>,<tbody>, <thead>, <tfoot>

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

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

2.3 Explain the tags, <form>, <input>, <button>, <label>, <select>, <options>, <textarea>, <legend> with attributes.
2.4 Explain the tags, <frame>, <frameset>, <noframe>, <iframe> with attributes.
2.5 Illustrate about cascading style sheets
2.6 Understand the level of styles inline, internal and embedded style sheets.
2.7 Explain ID and Class selectors in CSS
2.8 Explain about Color and background properties
2.9 Explain about Box properties like Border, position, margin, padding of elements.

**3.1 Understand XML and Java Script.**

3.2 Describe how to organize data in the form of XML.
3.3 Explain the rules for designing XML document.
3.4 Understand the significance of Namespace.
3.5 List the various applications of XML.
3.6 Differentiate between Client-side and Server-side scripting.
3.7 List Client side and server side scripting languages.
3.8 Describe the features of Java Script.
3.9 Placing JavaScript code in HTML.
3.10 Understand functions
3.11 Know how to define and call a function.
3.12 Know how to pass parameters.
3.13 Understand the purpose of GetElementById method
3.14 Describe the global functions provided by JavaScript.
3.15 Form Handling in Java Script
3.16 Illustrate Arrays
  3.16.1 Understand single and multi-dimensional arrays.
  3.16.2 Design small programs using arrays.
3.17 Understand about various Objects provided by JavaScript
  3.17.1 Math object
  3.17.2 String object
  3.17.3 Date object
  3.17.4 Boolean and Number object
3.18 Describe events in java script.

4.1 **JavaScript Ajax and JQuery**

4.2 Define AJAX
4.3 List the steps for designing a web application using AJAX.
4.4 Explain XMLHttpRequest Object properties and methods of XMLHttpRequest
4.5 Explain sending Ajax request to server and receiving a response from server with example program.
4.6 Define JQuery
4.7 List the features of JQuery
4.8 List JQuery plugins
4.9 Explain the steps for to includeJQueryin Web Pages
4.10 Explain JQuery Syntax with example program
4.11 Describe the jQuery Selectors-Accessing HTML elements by using
  4.11.1 Element Selectors
  4.11.2 ID, Class Selectors

4.12 Explain the JQuery Document Ready Event
4.13 Describe the JQuery Event handling methods(Mouse Events, Keyboard Events, Form Events, Document/Window events)
4.14 Explain effects of JQuery ( like hide, show, fadeIn, fadeout, fadeToggle,fadeTo, slideDown, SlideUp, SlideToggle)
4.15 Explain Functions in JQuery like text(),html(), val(), attr(),css().
4.16 Define AngularJS? Architecture, Advantages & Features.
4.17 List and Explain Angular JS Directives like ng-app,ng-init ,ng-model ,ng-repeat
4.18 Explain AngularJS Expressions like number, string,object,array.
4.19 Explain AngularJS Filters like lowercase,uppercase,filter,orderby,currency.

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

5.1 Understand the architecture of a Web server.
5.2 List the various web servers.
5.3 Illustrate the various HTTP request types and their difference.
5.4 Compare the properties of IIS, and Apache.
5.5 Explain how to combine HTML and PHP.
5.6 Explain how to access HTML, PHP documents from web servers.
5.7 List various Data types and explain them with examples.
5.8 Explain how to declare Variables and Constants.
5.9 List and explain string manipulation functions.
5.10 Understand Arrays
5.11 Explain types of arrays.
5.12 Design small programs using arrays.
5.13 Explain form handling using $_GET,$_POST methods
5.14 List and explain mysql database functions in PHP.
5.15 Explain the steps of connecting to a Database.
5.16 Know about retrieving data from a table.
5.17 Know about inserting data into a table.
5.18 Know about updating the data in a table.
5.19 Know about deleting data from a table.
5.20 Design some simple programs to insert, delete, update and retrieve data from database.
5.21 Define Cookie.
5.22 Know how to create and delete a cookie.
5.23 Know the purpose of cookie.
5.24 Define Session
5.25 Understand how to create a session.
5.26 Know how to destroy a session.
5.27 Know the purpose of session.
5.28 Differentiate Sessions and Cookies.
5.29 Explain how to pass data from one web page to other webpage.

## COURSE CONTENTS

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

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

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

**2. HTML & CSS:**Connecting to hyperlinks and Imaging, Forms, Frames,IFrame

**CSS :** Introduction, Inline styles, Embedded style sheets, Conflicting styles, Linking external Style sheets, Positioning elements, Backgrounds, Element dimensions

**3. XML &JavaScript:XML-**Introduction, Structuring Data, XML Namespaces, Applications of XML

**JAVA SCRIPT-**Introduction to Scripting, Client-Side versus Server-Side Scripting, JavaScript features, Functions – Function definitions, Use of Get Element ById, Get Element By Name, Global functions, Form handling, Arrays – Declaring and allocating arrays, References and reference parameters, passing arrays to functions, sorting and Searching arrays, Multiple-Subscripted arrays, Objects – **Math** object, **String** object, **Date** object, **Boolean** and **Number** object.

### 4. JavaScript-Ajax and J Query

**Java script-Ajax-**Introduction to AJAX, Steps for designing a web application using AJAX, XML Http Request Object- Properties and methods of XML Http Request, Sending a request to the server, receiving response from server using AJAX.

**J Query:** Introduction to J query, Features of J Query, Plugin used in J Query, steps for to include J Query in Web Page, J Query Syntax, j Query Selectors- Element, Selectors, ID, Class, Document Ready Event, J Query Event handling methods, effects of J Query, Functions in J Query

**Angular JS:** Introduction to Angular JS, Features, Advantages, Angular JS architecture, Directives, Expressions, Filters, Sample programs.

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

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

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

**REFERENCE BOOKS**


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

## MODEL BLUE PRINT

| S.No. | Chapter/Unit title | No.of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Principles of Web Designing and HTML Introduction. | 12 | 14 | 6 | | 8 | | 2 | | 1 | | CO1 |
| 2 | Understand various HTML tags and usage of style sheets. | 14 | 14 | 6 | | 8 | * | 2 | | 1 | * | CO2 |
| 3 | Understand XML and Client side scripting using Java Script. | 14 | 14 | 3 | | 11 | * | 1 | - | 2 | * | CO3 |
| 4 | JavaScript Ajax and J Query | 15 | 14 | 3 | 3 | 8 | * | 1 | 1 | 1 | * | CO4 |
| 5 | Web servers and Server side scripting using PHP | 20 | 14 | 3 | 3 | 8 | * | 1 | 1 | 1 | * | CO5 |
| | **Total** | **75** | **70+10*** | **21** | **6** | **43** | **10*** | **7** | **2** | **6** | **1** | |

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

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

| Unit Test | Learning outcomes to be covered |
|---|---|
| Unit test-1 | From 1.1 to 3.17 |
| Unit test-2 | From 4.1 to 5.29 |

## COMPUTER ORGANIZATION AND MICROPROCESSORS

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-403 | Computer Organization And Microprocessors | 5 | 75 | 20 | 80 |

| S.No. | Chapter/Unit Title | No.of Periods | CO's Mapped |
|---|---|---|---|
| 1. | CPU Organization | 11 | CO1 |
| 2. | Information representation and Arithmetic Operations | 22 | CO2,CO3 |
| 3. | Memory Organization | 15 | CO1,CO4 |
| 4. | I/O Organization | 15 | CO1,CO4 |
| 5. | Fundamentals of 8086 and Advanced Processors | 12 | CO5 |
| Total Periods | | 75 | |

| | | | |
|---|---|---|---|
| **Course Outcomes** | Upon completion of the course the student shall be able to | | |
| | CO1 | CM-403.1 | Explain the Basic computer organization techniques |
| | CO2 | CM-403.2 | Analyse various information representations |
| | CO3 | CM-403.3 | Analyse various algorithms of Arithmetic operations |
| | CO4 | CM-403.4 | Explain the peripheral organization |
| | CO5 | CM-403.5 | Describe the Features of Microprocessors |

**Learning Outcomes:**

**1.0 CPU ORGANIZATION**

1.1 Draw the functional block diagram of Digital computer and explain the function of each unit.

1.2 Define Register

1.3 State the purpose of

- 1.3.1 Accumulator
- 1.3.2 Program counter
- 1.3.3 Instruction Register
- 1.3.4 Memory Buffer Register
- 1.3.5 Memory Address Register

1.4 Draw the block diagram of simple accumulator based CPU.

1.5 Explain the function of each unit.

1.6 Define the terms micro operation, macro operation,

1.7 Define instruction cycle, fetch cycle and execution cycle.

1.8 Define stored program concept

1.9 Describe the sequential execution of a program stored in memory by the CPU

**2.0 Information representation and Arithmetic Operation**

2.1 Explain the basic types of information representation in a computer

2.2 Define floating point representation and fixed point representation of numbers.
2.3 Illustrate the floating point and fixed point representations with example.
2.4 Distinguish between Fixed point and Floating point representations.
2.5 Explain various Instruction formats
2.6 Define Opcode, Operand and address.
2.7 Explain different types of instructions with examples
2.7.1 Zero address instructions
2.7.2 One address instructions
2.7.3 Two address instructions
2.7.4 Three address instructions
2.8 List and explain various addressing modes.
2.9 Illustrate fixed point addition, subtraction, multiplication and division with numerical example
2.10 Explain the fixed point addition and subtraction operations with flowchart.
2.11 Explain the Fixed point multiplication operation with flowchart.
2.12 Explain the Fixed point division operation with flowchart.
2.13 Illustrate floating point addition, subtraction, multiplication and division with numerical example
2.14 Illustrate Floating point normalization with numerical example
2.15 Explain floating point addition, subtraction operations with flowchart
2.16 Explain floating point multiplication operation using Booth's algorithm
2.17 Explain floating division operation with flowchart.

**3.0 Memory Organization**

3.1 Distinguish between main and auxiliary memory.
3.2 State the need for memory hierarchy in a computer.
3.3 Explain memory hierarchy in a computer in detail
3.4 State the significance of various memory device characteristics: access time, access rate, alterability, permanence of storage, cycle time.
3.5 Discuss Associative Memory
3.6 Explain the principle of virtual memory organization in a computer system
3.7 Explain virtual address and physical address organization.
3.8 State the principle of locality of reference
3.9 Explain Cache memory organization.
3.10 Analyse the importance of the principle of memory interleaving in a computer.

**4.0 I/O Organization**

4.1 List the any five peripheral devices that can be connected to a computer.
4.2 Define Interface.
4.3 Explain the need for an interface.
4.4 List modes of date transfer.
4.5 Explain synchronous and asynchronous data transfer.
4.6 Compare synchronous and asynchronous data transfer.
4.7 Explain hand shaking procedure of data transfer.
4.8 Explain programmed I/O method of data transfer.
4.9 Explain interrupted initiated I/O.
4.10 Explain DMA controlled transfer.
4.11 Explain priority interrupt, polling, and daisy chaining priority.
4.12 Explain about bus system

4.13 List various bus systems.
4.14 Differentiate between i/o bus and memory bus

**5.0 Fundamentals of 8086 and Advanced Processors**

5.1 Define Microprocessor and list different types of processors.
5.2 Features of 8086 microprocessor
5.3 Draw the pin diagram 8086 microprocessor and describe the Pins and signals of 8086.
5.4 Draw the functional block diagram of 8086 microprocessor and describe the function of each block in 8086.
5.5 List the features of 80286, 80386, 80486 and Pentium processors.
5.6 Draw the functional block diagram of Intel Pentium processor and explain function of each unit.
5.7 Distinguish between 8086,80286,80386,80486.

**Course Contents**

**1. Processor Organization** - functional block diagram of Digital computer -Simple accumulator based CPU and function of each unit.-Stored program concept
**2.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.- fixed point addition and subtraction, multiplication and division operations - floating point addition, subtraction, multiplication and division operations with flowcharts.
**3. 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
**4. 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
**5. Fundamentals of 8086 and Advanced Processors-** Different types of processors.-Features of 8086 microprocessor- pin diagram 8086 microprocessor - Functional block diagram of 8086 microprocessor -Features of 80286, 80386, 80486 and Pentium processors. Functional block diagram of Intel Pentium processor - Distinguish between 8086,80286,80386,80486.

**Reference Books**

1. Structured Computer Organization -- Andrews Tennenbaum.
2. Computer Organization -- Govindarajulu (TMH).
3. Computer Organization & Architecture -- William Stallings
4. Computer System Architecture --- Morris Mano
5.Computer Organization – Car Hamacher, ZvonksVranesic, SafwatZaky, V Edition, McGraw Hill, 2002.

6.Computer Architecture and Organization – John P. Hayes, Mc Graw Hill International editions, 1998.
7.Computer architecture and organization , 4th edition , P Chakraborty , JAICO publishers
8. Microprocessors & Interfacing -- Douglas V.Hall

**MODEL BLUE PRINT**

| S.No. | Chapter/Unit title | No.of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | CPU Organization | 10 | 14 | 6 | 8 | | | 2 | 1 | | | CO1 |
| 2 | Information representation , Arithmetic Operations | 25 | 14 | 6 | 8 | | * | 2 | 1 | | * | CO2,CO3 |
| 3 | Memory Organization | 15 | 14 | 6 | 8 | | * | 2 | 1 | | * | CO1,CO4 |
| 4 | I/O Organization | 15 | 14 | 6 | 8 | | | 2 | 1 | | | CO1,CO4 |
| 5 | Fundamentals of 8086 and Advanced Processors | 10 | 14 | 6 | 8 | | * | 2 | 1 | | * | CO5 |
| | **Total** | **75** | **70+10*** | **30** | **40** | | **10*** | **10** | **5** | | **1** | |

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

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

| Unit Test | Learning outcomes to be covered |
|---|---|
| Unit test-1 | From 1.1 to 3.4 |
| Unit test-2 | From 3.5 to 5.7 |

## OOP THROUGH C++

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-404 | OOP through C++ | 5 | 75 | 20 | 80 |

| S.No. | Chapter/Unit Title | No.of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Object oriented programming concepts & Introduction to C++ | 15 | CO1, CO2 |
| 2. | Functions, Arrays, Pointers & References | 15 | CO2, CO6 |
| 3. | Constructors, Destructors & Operator overloading | 15 | CO3, CO6 |
| 4. | Inheritance& Virtual functions | 15 | CO4, CO6 |
| 5. | C++ I/O & Templates | 15 | CO5, CO6 |
| **Total Periods** | | **75** | |

| | Upon completion of the course the student shall be able to | | |
|---|---|---|---|
| **Course Outcomes** | CO1 | CM-404.1 | Explain the Principles of object oriented programming |
| | CO2 | CM-404.2 | Develop programs using classes, objects and functions |
| | CO3 | CM-404.3 | Write programs for constructors, destructors and operator overloading concepts. |
| | CO4 | CM-404.4 | Develop programs for different types of inheritances, virtual base class and virtual functions |
| | CO5 | CM-404.5 | Define C++ I/O stream and Templates |
| | CO6 | CM-404.6 | Use the features of OOP's in designing applications |

**Learning Outcomes:**

**1.0 Object oriented programming concepts & Introduction to C++**

- **1.1** Evolution of OOP's
- **1.2** Describe procedure oriented programming
- **1.3** Describe Object oriented paradigm
- **1.4** State Basic concepts of object oriented programming
- **1.5** List the Benefits of OOP's
- **1.6** List different types of Object oriented programming languages
- **1.7** Write the structure of C++ program
- **1.8** Demonstrate to Create, compile, link and execute a C++ program.
- **1.9** Differentiate between C, C++
- **1.10** Explain C++ I/O operations with examples
- **1.11** Explain Syntax of comment statements in C++

**1.12** List keywords of C++ other than C
**1.13** Explain C++ Operators

**2.0 Functions, Arrays, Pointers & References**

**2.1** Define function and its prototype
**2.2** Explain the concept of Default Arguments
**2.3** Explain the concept of function overloading
**2.4** Explain inline function and write its advantages
**2.5** Explain friend function and its use
**2.6** Declare and use references
**2.7** Define a class & object in C++
**2.8** Define, Declare and use Class
**2.9** Compare classes with structures
**2.10** Explain Creation of objects
**2.11** Declare and access array of objects
**2.12** Explain the concept of passing objects to functions
**2.13** Explain the concept of returning objects from functions
**2.14** Describe pointers to object
**2.15** State the use of pointer object in C++
**2.16** Explain the process of declaring an object pointer and accessing date members of it with an example.
**2.17** State the use of 'this' operator
**2.18** Explain the operation of dynamic memory allocation using new and delete operators
**2.19** Write a program to perform dynamic memory allocations with suitable example.

**3.0 Constructors, Destructors and Operator Overloading**

**3.1** Define constructor and destructor
**3.2** Explain Parameterized constructors
**3.3** Describe Multiple Constructors in a class
**3.4** Describe Constructors with default arguments
**3.5** Describe Copy Constructor
**3.6** Describe Dynamic constructor
**3.7** Define Destructor and develop a program to demonstrate destructors
**3.8** Describe Operator Overloading
**3.9** Develop programs for Overloading of Binary Operators
**3.10** Develop programs for Overloading of Unary Operators
**3.11** Develop programs for Overloading of Binary Operators with ordinary member function and friend function
**3.12** Develop programs for Overloading of Unary Operators with ordinary member function and friend function
**3.13** List the rules for overloading of operators
**3.14** Illustrate the above with small programs

**4.0 Inheritance& Virtual functions**

**4.1** State the necessity of inheritance.
**4.2** Explain the relation between base class and derived class.
**4.3** Write the syntax for defining a derived class
**4.4** Explain three types of access control – public, private & protected
**4.5** List Types of Inheritances and explain them with examples
**4.6** Write a program using C++ for Single inheritance
**4.7** Develop a program using C++ for Multi level inheritance

**4.8** Develop a program using C++ for Multiple inheritance
**4.9** Develop a program using C++ for Hybrid inheritance
**4.10** Develop a program using C++ for Multipath inheritance
**4.11** Develop a program using C++ for Hierarchical inheritance
**4.12** Describe Virtual base class
**4.13** Explain concept of virtual functions and its applications
**4.14** Write small programs to illustrate the above concepts.

**5.0 C++ I/O &Templates**

**5.1** Write the basics of formatted I
**5.2** Explain I/O manipulators and give examples.
**5.3** Explain file I/O and classes of stream.h.
**5.4** Explain the binary I/O functions like get ( ) and put ( ).
**5.5** Write the format and working of file I/O functions like open ( ), read ( ), write ( ), count ( )
**5.6** Explain the need for Templates.
**5.7** List types of Templates.
**5.8** Describe Function Templates
**5.9** Develop a C++ program for Templates with Single Argument Types
**5.10** Develop a C++ program to Create function based Templates
**5.11** Develop a C++ program for Templates with multiple argument types
**5.12** State the use of Class Templates
**5.13** Mention the Syntax of Class Template
**5.14** Develop a C++ program to Create Classes based on Template
**5.15** Develop a C++ program using Class Template for Stack Data Structure
**5.16** Develop a C++ program using Class Template for Queue Data Structure

**COURSE CONTENT**

**1. Object oriented programming concepts & Introduction to C++:**

Evolution of OOP's - Procedure oriented programming - Object oriented paradigm - basic concepts of object oriented programming - benefits of OOP's- Structure of C++ program - I/O Operations – statements – keywords -- Operators.

**2. Functions, Arrays, Pointers & References**

Class - object functions - classes & structures - friend function - inline functions - passing objects to functions – pass by value and pass by reference - returning objects from functions - virtual function - function overloading- Using Arrays - array of objects - pointers to objects - this operator - dynamic memory allocations -references.

**3. Constructors, Destructors and Operator Overloading**

Constructor and destructor - Parameterized constructors - Multiple Constructors - Constructors with default arguments - Copy Constructor – dynamic constructor - Destructors - Operator Overloading - Overloading of Binary Operators - Overloading of Unary Operators - Rules for overloading of operators - Example programs on Operator overloading.

**4. Inheritance & Virtual functions**

Base Class and derived class - access control - types of inheritance – Single, Multi level, Multiple, Hybrid, Multipath, Hierarchical - virtual base class - virtual functions.

**5. C++ I/O & Templates**

C++ I/O operators - formatted I/O - I/O manipulators - file I/O - binary I/O functions - file I/O functions - Need for Templates – classification of templates, function templates – single argument and multiple argument - class templates.

**REFERENCE BOOKS**


1. Teach yourself C++ - Helbertschildt Osborne McG
2. Object-oriented Programming with C++ - Poorna chandraSarang PHI
3. Programming with C++ - E. Balaguruswamy – TMH
4. Computer Science: A Structured Approach using C++ - Forouzan/Gillberg – Thomson
5. C++ & OOPS Paradigm - DebasishJana PHI


**MODEL BLUE PRINT**

| S.No. | Chapter/Unit title | No.of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Object oriented programming concepts & Introduction to C++ | 15 | 14 | 6 | 8 | | | 2 | 1 | | | CO1, CO2 |
| 2 | Functions, Arrays, Pointers & References | 15 | 14 | 3 | 11 | | * | 1 | 2 | | * | CO2, CO6 |
| 3 | Constructors, Destructors & Operator overloading | 15 | 14 | 6 | 8 | | * | 2 | 1 | | * | CO3, CO6 |
| 4 | Inheritance & Virtual functions | 15 | 14 | 3 | 11 | | * | 1 | 2 | | * | CO4, CO6 |
| 5 | C++ I/O& Templates | 15 | 14 | 3 | 11 | | * | 1 | 2 | | * | CO5, CO6 |
| | Total | 75 | 70+10* | 21 | 49 | | 10* | 7 | 8 | | 1 | |

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

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

| Unit Test | Learning outcomes to be covered |
|---|---|
| Unit test-1 | From 1.1 to 3.7 |
| Unit test-2 | From 3.8 to 5.16 |

## COMPUTER NETWORKS

| Course code | Course Title | No. of Periods /Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-405 | Computer Networks | 5 | 75 | 20 | 80 |

| S.No. | Chapter/Unit Title | No.of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Introduction to Networks | 15 | CO1,CO2 |
| 2. | LAN components, Devices, tools, and Network Topologies. | 15 | CO3 |
| 3. | Network Addressing and sub-netting | 15 | CO3, CO4, CO6 |
| 4. | Networks protocols and management | 20 | CO3, CO5,CO6 |
| 5. | Basic Network administration | 10 | CO6 |
| Total Periods | | 75 | |

| | Upon completion of the course the student shall be able to | | |
|---|---|---|---|
| Course Outcomes | CO1 | CM-405.1 | Explain different types of networks, cables and connectors |
| | CO2 | CM-405.2 | Explain ISO /OSI reference model and TCP/IP model |
| | CO3 | CM-405.3 | Explain Network components, tools, devices and topologies |
| | CO4 | CM-405.4 | Configure network using subnet technology using suitable IP addresses |
| | CO5 | CM-405.5 | Describe different types of network protocols |
| | CO6 | CM-405.6 | Apply the techniques for Troubleshooting in monitoring and administrating network |

**Learning Outcomes:**

**1.0 Introduction to Computer Networks.**

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

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

2.1 Discuss the need and importance of LAN Cables, Connectors, wireless network adapter
2.2 Explain about LAN Cables
2.2.1 Coaxial Cables,

2.2.2 Twisted-Pair Cables(Shielded, Unshielded)
2.2.3 Optical Fibre Cables,
2.3 Explain about LAN Connectors.
2.3.1 Registered Jack(RJ)-45
2.3.2 Straight Tip (ST)
2.3.3 Subscriber Connector (SC)0
2.3.4 Lucent Connector (LC)
2.4 Explain about LAN Devices
2.4.1 Repeaters
2.4.2 Hubs
2.4.3 Switches
2.4.4 Network Interface Cards(NICs)
2.4.5 Routers ( CISCO, DAX, Etc.)
2.4.6 Modem (56KBPS Internal or External, ADSL Modems.)
2.4.7 Gateways.
2.5 Explain about Wireless network adapter
2.6 List and Explain the functions of LAN Tools
2.6.1 Anti-Magnetic mat
2.6.2 Anti-Magnetic Gloves
2.6.3 Crimping Tool
2.6.4 Cable Tester
2.6.5 Cutter
2.6.6 Loop back plug
2.6.7 Toner probe
2.6.8 Punch down tool
2.6.9 Protocol analyzer
2.6.10 Multi meter
2.7 Explain about Topologies with their merits and de-merits
2.7.1 Bus
2.7.2 Ring
2.7.3 Star
2.7.4 Mesh
2.7.5 Hybrid Topologies

**3.0 Network Addressing and sub-netting**

3.1 Introduction to Network Addressing.
3.2 Explain TCP/IP Addressing Scheme.
3.3 List and describe the Components of IP Address.
3.4 List and explain IP Address Classes.
3.5 Define subnet and describe the necessity of sub-netting.
3.6 Illustrate sub-netting
3.7 Explain sub-netting with a simple example
3.8 List the Advantages and disadvantages of sub netting
3.9 Describe the Internet Protocol Addressing
3.9.1 IPv4
3.9.2 IPv6
3.10 State the need for IPv6.
3.11 Explain about Classful addressing and classless addressing inIPv4.
3.12 Describe Internet protocol version-6 (IPv6) addressing.

**4.0 Networks protocols and management**

4.1 Describe need of protocols in computer networks

4.2 Explain the protocols
- 4.2.1 Hyper Text Transfer Protocol(HTTP)
- 4.2.2 File Transfer Protocol(FTP)
- 4.2.3 Simple Mail Transfer Protocol(SMTP)
- 4.2.4 Address Resolution Protocol(ARP)
- 4.2.5 Reverse Address Resolution Protocol(RARP)
- 4.2.6 Telnet

4.3 Describe Simple Network Management Protocol(SNMP)
4.4 Explain about working of SNMP.
4.5 Explain about DHCP, DNS
4.6 Explain the Overview of Network Management.
4.7 Explain Network Monitoring and Troubleshooting.
4.8 Explain about Remote Monitoring (RMON).

**5.0 Basic Network administration**

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

**COURSE CONTENTS**

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

**Reference Books:**


1. “Introduction to Data Communications and Networking”, B. Forouzan, Tata McGrawHill
2. “Computer Networks”, Tanenbaum, PHI,
3. “Data and Computer Communications”, Stallings, PHI,
4. “Data Communication”, William Schewber, McGrawHill,1987

## MODEL BLUE PRINT

| S.No. | Chapter/Unit title | No. of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Introduction to Networks | 15 | 14 | 8 | 6 | | | 1 | 2 | | | CO1,CO2 |
| 2 | LAN components, Devices, tools, and Network Topologies. | 15 | 14 | 6 | 8 | | | 2 | 1 | | | CO3 |
| 3 | Network Addressing and sub-netting | 15 | 14 | | 3 | 11 | * | | 1 | 2 | * | CO3, CO4, CO6 |
| 4 | Networks protocols and management | 20 | 14 | 3 | 8 | 3 | * | 1 | 1 | 1 | * | CO3, CO5,CO6 |
| 5 | Basic Network administration | 10 | 14 | | 6 | 8 | * | | 2 | 1 | * | CO6 |
| | **Total *** | **75** | **70 +10*** | **17** | **31** | **22** | **10*** | **4** | **7** | **4** | **1** | |

Note: Part-C: 10 marks single analytical question may be chosen from chapters marked with *.

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

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

## WEB TECHNOLOGIES LAB

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM- 406 | **Web Technologies Lab** | 6 | 90 | 40 | 60 |

| S.No. | Chapter/Unit Title | No.of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Exercises on HTML, CSS&XML | 30 | CO1 |
| 2. | Exercises on Java Script, AJAX, jQuery and Angular JS | 30 | CO2 |
| 3. | Exercises on PHP web applications and Database Applications | 30 | CO3,CO4 |
| Total Periods | | 90 | |

| | | | |
|---|---|---|---|
| **Course Outcomes** | Upon completion of the course the student shall be able to | | |
| | CO1 | CM-406.1 | Design interactive web page(s) using HTML, CSS and JavaScript. |
| | CO2 | CM-406.2 | Demonstrate the Usage of AJAX, jQuery and Angular JS |
| | CO3 | CM-406.3 | Design Dynamic web site using server side PHP Programming |
| | CO4 | CM-406.4 | Design a simple web application with database connectivity using PHP. |
| | CO5 | CM-406.5 | Develop real world application with different web designing tools. |

### LEARNING OUTCOMES

1. Exercises 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. Exercises on CSS.
6. Exercises on designing a XML document.
7. Exercises on JavaScript functions.
8. Exercises on JavaScript arrays.
9. Write a JavaScript program using Ajax, to send the request to server and receive the response from server with example program.
10. Write a program on mouse events using jQuery.
11. Design a webpage to apply the Effects of jQuery to HTML elements.
12. Exercises on changing background color using css() function in jQuery.
13. Write a JavaScript program using DatePickerjQuery UI plugin-(download from https://jqueryui.com/datepicker/)
14. Write a Java Script program using Responsive Slides jQuery plugin-(download from responsiveslides.com)

15. Exercises on Angular JS Directives.
16. Install the following on local machine:
    - Apache Web server
    - MySQL
    - PHP and configure it to work with Apache Web server and MySQL.
17. Exercises on PHP arrays.
18. Design a form and access the elements of form using PHP.
19. Write PHP program to perform various operations on a database table using functions.
20. Write a PHP program to set a cookie.

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

**OBJECTIVES AND KEY COMPETENCIES:**

| Exp No. | Name of the experiment | Objectives | Key Competencies |
|---|---|---|---|
| 1 | Exercises on basic HTML tags | Create the HTML page with a title, heading, formatting and list tags in the body. | 1) Use any editor for writing HTML<br>2) Add the tags with relevant content<br>3) Save the file<br>4) Open the file in a browser<br>5) Test the results |
| 2 | Design a HTML page using suitable table tags and attributes | Create the HTML page with a table and that table should have a header, body and footer. | 1) Identify the tags for creating the table<br>2) Add header, body and footer to the table.<br>3) Put some content in each section of table<br>4) Save the file<br>5) Open the file in a browser<br>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<br>2) Add the form and put some controls in it.<br>3) Save the file<br>4) Open the file in a browser<br>5) Test the results |
| 4 | Design a HTML page on frames | Create the HTML page with multiple frames so that content in each frame will have different format and colors. | 1) Identify the tags for creating multiple frames<br>2) Add some content to the frames and use different formats, colors for each frame.<br>3) Save the file<br>4) Open the file in a browser<br>5) Test the results |

| Exp No. | Name of the experiment | Objectives | Key Competencies |
|---|---|---|---|
| **5** | Design a style sheet to set the background color, position and dimensions of a HTML element | Create a style sheet which contains selectors to set the background color, position and dimensions of a HTML element. | 1)Identify the editor required for creating CSS<br>2)Add selectors to set the background color, position and dimensions of an element.<br>3)Save the CSS file<br>4)Link the CSS file to a valid HTML page.<br>5)Save the HTML page<br>6)Open the HTML page in a browser<br>7)Test the results |
| 6 | Exercises on designing a XML document | Create a XML Document on Student data | 1) Identify the editor required for creating XML<br>2) Add required elements for student data<br>3) Save the XML file as .xml extension<br>4) Open the XML document in browser<br>5)Test the results |
| 7 | Exercises on JavaScript functions | Write a JavaScript program using function which performs sum of two numbers and function should call when button is clicked. | 1) Create a HTML file<br>2) Write a JavaScript function which adds two numbers.<br>3) Add HTML button tag and assign a function to on click attribute.<br>4) Save the HTML file.<br>5) Open the HTML page in a browser<br>6) Test the results Resolve the errors if any through debugging |
| 8 | Exercises on JavaScript arrays | Write JavaScript code to implement sorting like reading an array of ‗n' numbers and sorting them in ascending order. | 1) Create a HTML file<br>2) Add elements to read array and to sort.<br>3) Write the logic for sorting using iterative and conditional statements.<br>4) Save the HTML file.<br>5) Open the HTML page in a browser<br>6) Test the results<br>Resolve the errors if any through debugging |

| Exp No. | Name of the experiment | Objectives | Key Competencies |
|---|---|---|---|
| 9 | Write a JavaScript program using Ajax, to send the request to server and receive the response from server with example program | Write JavaScript program which sends a request to server using ajax, receives information and display it. | 1) Create a HTML file<br>2) Create a function which sends a request to "https://www.w3schools.com/xml/ajax_info.txt" and receive the information and display in the body.<br>3) Create a button.<br>4) Call JavaScript function when button click.<br>5) Save the HTML file.<br>6) Open the HTML page in a browser<br>7) Test the results. Resolve the errors if any through debugging<br>8) Observe that when button click that is displayed without reloading the page. |
| 10 | Write a program on mouse events using JQuery | Write a JavaScript program using JQuery which displays different messages for mouse events like mouse enter, mouse leave, click, dblclick | 1) Create a HTML file<br>2) Add a div tag with some content and border.<br>3) Write a JQuery functions which displays different messages when mouse enters in div tag, mouse leaves div tag and clicks on div tag.<br>4) Save the HTML file.<br>5) Open the HTML page in a browser<br>6) Test the results by moving moues over the div tag.<br>7) Resolve the errors if any through debugging |
| 11 | Design a webpage to apply the Effects of jQuery | Write a JavaScript program using jQuery which performs effects like hide, show, slideupfadeIn,fadeout, slideDown, SlideUp | 1) Create a HTML file<br>2) Add a div tag with some content and border.<br>3) Add some buttons<br>4) Write a jQuery functions which performs some effect when click on respective button.<br>5) Save the HTML file.<br>6) Open the HTML page in a browser<br>7) Test the results by click on the button.<br>Resolve the errors if any through debugging |

| Exp No. | Name of the experiment | Objectives | Key Competencies |
|---|---|---|---|
| 12 | Exercises on changing background color using CSS properties in jQuery | Write a JavaScript program using jQuery which changes css properties like color, background-color, border etc. | 1) Create a HTML file<br>2) Add a div tag with some content<br>3) Add some buttons<br>4) Write a jQuery functions which changes CSS properties like color, border when click on respective button.<br>5) Save the HTML file.<br>6) Open the HTML page in a browser<br>7) Test the results by click on the button.<br>Resolve the errors if any through debugging |
| 13 | Write a JavaScript program using Date Picker jQuery UI plugin(download from https://jqueryui.com/datepicker/) | Write a JavaScript program using jQuery which displays datepicker. | 1) Create a HTML file<br>2) Add jQuery script tag.<br>3) Add JQueryUI, which can be downloaded from https://jqueryui.com<br>4) Add jQuery UI css file<br>5) Add a textbox<br>6) Write jQuery code for display date picker<br>7) Save the HTML file.<br>8) Open the HTML page in a browser<br>9) Test the results by click on the button.<br>Resolve the errors if any through debugging |
| 14 | Write a JavaScript program using Responsive SlidesjQuery plugin(download from responsiveslides.com) | Write a JavaScript program using jQuery which displays date picker. | 1) Create a HTML file<br>2) Add jQuery script tag.<br>3) Add slider plugin, which can be downloaded from http://responsiveslides.com<br>4) Add plugins file<br>5) Add images<br>6) Write jQuery code for display slideshow of images<br>7) Save the HTML file.<br>8) Open the HTML page in a browser<br>9) Test the results by click on the button.<br>Resolve the errors if any through debugging |
| 15 | Exercises On Angular JS Directives | Exercise On Angular JS Directives | 1) Create a HTML file<br>2) Add https://ajax.googleapis.com/ajax/libs/angularjs/1.3.14/angular.min.js file in Script tag of src.<br>3) Save the HTML file.<br>4) Open the HTML page in a browser<br>5) Test the results by click on the button.<br>Resolve the errors if any through debugging |

| Exp No. | Name of the experiment | Objectives | Key Competencies |
|---|---|---|---|
| 16 | Install the following on local machine:<br>• Apache Web server<br>• MySQL<br>• 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<br>2) Download the software(XAMP)<br>3) Install the server software(XAMP)<br>4) Configure the server<br>5) Write simple PHP program<br>6) Test the result |
| 17 | Exercise on PHP arrays | Write PHP program to implement searching like reading an array of 'n' numbers and finding smallest among them. | 1) Create a PHP file.<br>2) Add elements to read array and to find the smallest number.<br>3) Write the logic for sorting using iterative and conditional statements.<br>4) Save and Run the page.<br>Test the result |
| 18 | Design a form and access the elements of form using PHP | Write a php program which displays sum of two numbers submitted by the form | 1) Create a HTML file<br>2) Add form with two textboxes for enter two numbers<br>3) Write a PHP program, which adds two numbers submitted by form and display the sum.<br>4) Place the files in server<br>5) Open the HTML file in browser<br>6) Test the results |
| 19 | Write PHP code to perform various operations on a database table using functions. | Write PHP code to perform retrieval, insertion, modification and deletion of data in a database table using functions | 1) Understand the process of connecting to database and execute commands.<br>2) Create a PHP file.<br>3) Add required elements to the page.<br>4) Write the logic to retrieve, insert, update and delete data in the table using functions.<br>5) Save and Run the page.<br>6) Test the result |
| 20 | Write a PHP program to set a cookie. | Write PHP code to create a cookie and put some information in it. | 1) Understand the significance of cookies.<br>2) Create a PHP file.<br>3) Write the logic to create and set a cookie<br>4) Save and Run the page.<br>5) Test the result. |

## OOP THROUGH C++ LAB

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-407 | OOP through C++ Lab | 4 | 60 | 40 | 60 |

| S.No. | Chapter/Unit Title | No.of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Exercise Programs on C++ basic constructs | 10 | CO1 |
| 2. | Exercise Programs on Classes and Objects | 15 | CO1 |
| 3. | Exercise Programs on Operator Overloading | 10 | CO2 |
| 4. | Exercise Programs on Inheritance | 15 | CO3 |
| 5. | Exercise Programs on Templates | 10 | CO4,CO5 |
| | Total Periods | 60 | |

| | | | |
|---|---|---|---|
| **Course Outcomes** | Upon completion of the course the student shall be able to | | |
| | CO1 | CM-407.1 | Execute programs using I/O operators, loops, Classes, objects and functions. |
| | CO2 | CM-407.2 | Write programs using Constructors, Destructors and Operator overloading |
| | CO3 | CM-407.3 | Execute programs using Derived classes and types of inheritance. |
| | CO4 | CM-407.4 | Run generic programs using Templates |
| | CO5 | CM-407.5 | Develop a project in real world problems. |

**Learning Outcomes**

1. Write programs using input and output operators and comments.
2. Write programs using if/ if – else/ nested if statement.
3. Write programs using loop statements – while/ do-while / for.
4. Write programs using arrays.
5. Write programs using classes & object.
6. Write programs using constructor and destructor.
7. Write programs working with two/more classes using Friend function.
8. Write programs using inline function.
9. Write a program to pass an object as a functions argument – pass object by Value, pass object by reference.
10. Write a program to demonstrate the use of function overloading.
11. Write a simple program on array of objects and pointers to objects.
12. Write a program to demonstrate the operator overloading on unary & binary operators
13. Write programs using new, delete with classes.
14. Write simple programs illustrating use of all types of inheritances.

15. Write a program to illustrate virtual base class.
16. Write a Program to illustrate virtual functions.
17. Write a Program to illustrate class templates.
18. Write a Program to illustrate function templates

**Reference Books:**


1. Teach yourself C++ - Helbertschildt Osborne McG
2. Object-oriented Programming with C++ - PoornachandraSarang PHI
3. Programming with C++ - E. Balaguruswamy – TMH
4. Computer Science: A Structured Approach using C++ - Forouzan/Gillbert - Thomson
5. C++ & OOPS Paradigm - DebasishJana PHI


**E-References:**

1. https://www.tutorialspoint.com/cplusplus/index.htm
2. http://www.cplusplus.com/doc/tutorial/
3. https://www.programiz.com/cpp-programming
4. https://beginnersbook.com/2017/08/c-plus-plus-tutorial-for-beginners/
5. **http://www.cplusplus.com/files/tutorial.pdf**

**OBJECTIVES AND KEY COMPETENCIES:**

| Exp. No. | Name of the experiment | Objectives | Key Competencies |
|---|---|---|---|
| 1 | Write programs using input and output operators and comments. | (a) Write a program to accept input and display it.<br>(b) Write comments in a program. | (a) Identify the header files required<br>(c) Use *cin* and *cout*.<br>(d) Write comments.<br>(e) Compile the program.<br>(f) Rectify the errors in the program.<br>(g) Run the program.<br>(h) Test the output with various input data.<br>(i) Save the file. |
| 2 | Write programs using if/ if – else/ nested if statement. | Write programs using conditional control statement. | (a) Identify the header files required<br>(b) Use various conditional control statements.<br>(c) Compile the program.<br>(d) Rectify the errors in the program.<br>(e) Run the program.<br>(f) Test the output with various input data.<br>(g) Save the file. |

| | | | |
|---|---|---|---|
| 3 | Write programs using loop statements – while/ do-while / for. | (a) Write a program using loop statements.<br>(b) Write the same program using other loops. | (a) Identify the header files required<br>(b) Use various loop statements.<br>(c) Compile the program.<br>(d) Rectify the errors in the program.<br>(e) Run the program.<br>(f) Observe the output with various input data.<br>(g) Save the file.<br>(h) Write the same program using while/ do – while/ for statement. |
| 4 | Write programs using arrays. | Write programs using arrays. | (a) Identify the header files required<br>(b) Declare array.<br>(c) use appropriate loop statements to input and process arrays.<br>(d) Compile and Rectify the errors if any.<br>(d) Execute and Test the output. |
| 5 | Write programs using classes & object. | (a) Write a program using classes and objects and define the methods within the class.<br>(b) Write a program using classes and objects and define the methods outside the class. | (a) Create a class<br>(b) Identify data members required and define methods to a class.<br>(c) Declare methods within the class and outside the class.<br>(d) Use scope resolution operator.<br>(e) Create objects of a class.<br>(f) use objects to develop code<br>(f) Execute the program. |
| 6 | Write programs using constructor and destructor. | (a) Write a program using default constructor.<br>(b) Write a program using parameterized constructor.<br>(c) Write a program using copy constructor.<br>(d) Write a program using constructor and destructor. | (a) use appropriate type of constructors & destructor.<br>(c) develop the code for the required concept using initiations done by constructors<br>(d) Compile ,execute and test the result |
| 7 | Write programs working with two/more classes using friend function. | Write a program using friend function. | (a) Develop classes to access data members using proper access specifiers<br>(b) Declare friend function.<br>(c ) develop code using friend |

| | | | |
|---|---|---|---|
| | | | functions and related objects<br>(d) Compile ,execute and test the result |
| 8 | Write programs using inline function. | Write a program using inline function. | (a) Declare inline function with syntax.<br>(b) use in file functions as required<br>(c) Compile ,execute and test the result |
| 9 | Write a program to pass an object as a function argument. | Write a program to pass an object as a functions argument (a) pass object by value, (b) pass object by reference. | (a) Pass objects by value.<br>(b) Pass objects by reference. |
| 10 | Write a program to demonstrate the use of function overloading. | Write program to illustrate the usage of function overloading. | (a) Use function overloading.<br>(b) Declare methods in function overloading. |
| 11 | Write a simple program on array of objects and pointers to objects. | Write a simple program on array of objects and pointers to objects. | (a) Create array of objects.<br>(b) Create pointers to objects. |
| 12 | Write a program to demonstrate the use of operator overloading on unary operator & binary operators like ++ operator and << operator. | (a) Write a program using unary operator.<br>(b) Write programs using binary operator. | (a) Use operator overloading for unary and binary operators.<br>(b) Declare methods for operator overloading. |
| 13 | Write programs using new, delete with classes. | Write programs to illustrate the use of new and delete with classes. | Use dynamic allocation operators. |
| 14 | Write simple programs illustrating use of all types of inheritances. | Write simple programs illustrating use of<br>(a) single inheritance.<br>(b) multiple inheritance.<br>(c) multilevel inheritance. | (a) Create base class and derived class.<br>(b) Use: operator.<br>(c) Use access specifiers. |
| 15 | Program illustrating virtual base class. | Write a program to illustrate the usage of virtual base class. | (a) Create virtual base class.<br>(b) Use virtual keyword. |
| 16 | Program illustrating virtual functions. | Write a program to illustrate the usage of virtual functions. | (a) Create virtual functions.<br>(b) Use virtual keyword. |
| 17 | Programs illustrating class | Write a program to illustrate the usage of | (a) Use class templates<br>(b)Create class templates. |

| | | | |
|---|---|---|---|
| | templates. | class templates. | |
| 18 | Programs illustrating function templates. | Write a program to illustrate the usage of function templates. | (a) Create function templates with single argument.<br>(b) Create function templates with multiple arguments. |

## COMMUNICATION SKILLS

| Course Code | Course Title | No. of Periods/Week | Total No. of Periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| Common 408 | Communication Skills | 3 | 45 | 40 | 60 |

| S. No. | Unit Title | No of Periods | COs Mapped |
|---|---|---|---|
| 1 | **Listening Skills** | 6 | CO1 |
| 2 | **Introducing Oneself** | 3 | CO1, CO2, CO3 |
| 3 | **Short Presentation (JAM)** | 6 | CO1, CO2, CO3 |
| 4 | **Group Discussion** | 6 | CO1, CO2, CO3 |
| 5 | **Preparing Resume with Cover Letter** | 3 | CO3 |
| 6 | **Interview Skills** | 9 | CO1, CO2, CO3 |
| 7 | **Presentation Skills** | 9 | CO1, CO2 |
| 8 | **Work place Etiquette** | 3 | CO1, CO2 |
| **Total Periods** | | **45** | |

| CO No. | Course Outcomes |
|---|---|
| CO1 | Interacts in academic and social situations by comprehending what is listened to when others speak. |
| CO2 | Demonstrates effective English communication skills while presenting ideas, opinions in group discussions and presentations on topics of general and technical interest |
| CO3 | Exhibits workplace etiquette relevant in classroom situations for easy adaptation in professional setting in the future |

**Blue Print for evaluation based on Course Outcomes for SA:**

**Note: Every Question based on CO has to be given marks for the following parameters of communication in the rubric.**

- Fluency and Coherence
- Lexical Resource (Vocabulary)
- Grammatical Range and Accuracy

***Rubric Descriptors 'Good/ Competent / Fair /Poor' for Communication**

| LEVEL OF COMPETENCE | Fluency and Coherence | Lexical Resource (Vocabulary) | Grammatical Range and Accuracy |
|---|---|---|---|
| **GOOD (9-10*)** | Speaks at length without noticeable effort or loss of coherence. May demonstrate language-related hesitation at times, or some repetition and/or self-correction. | Uses vocabulary resources flexibly during discussion. Uses paraphrase effectively. | Uses a range of complex structures with some flexibility. |
| | Uses a range of connectives and discourse markers with some flexibility. **Articulates and adapts to near naturalization.** | Uses some less common vocabulary and shows some awareness of style and collocation | Mostly produces error-free sentences. |
| **COMPETENT (6-8)** | Is willing to speak at length, though may lose coherence at times due to occasional repetition, self-correction or hesitation. | Has enough vocabulary to discuss topics and make meaning clear in spite of inappropriacies. | Uses a mix of simple and complex structures, but with limited flexibility. |
| | Uses a range of connectives and discourse markers but not always appropriately. | Generally paraphrases successfully | May make mistakes with complex structures though these rarely cause comprehension problems. |
| **FAIR (3-5)** | Tries to maintain a flow of speech but t uses repetition, self correction and/or slow speech to keep going. | Manages to talk about familiar and unfamiliar topics but uses vocabulary with limited flexibility. | Produces only basic sentence forms, however, errors persist. |
| | Produces simple speech fluently, but more complex communication causes fluency problems. | Attempts to use paraphrase but with mixed success. | Uses a limited range of more complex structures, but these usually contain errors and may cause some comprehension problems |
| **POOR (0 *-2)** | Speaks with long pauses. Pauses lengthy before most words. **Merely imitates** | Uses simple vocabulary to convey personal information | Attempts basic sentence forms but with limited success, or relies on apparently memorized |

| | | | |
|---|---|---|---|
| | | | utterances |
| | Has limited ability to link simple sentences | Has insufficient vocabulary for less familiar topics | Makes numerous errors except in memorized expressions |
| | Gives only simple responses and is frequently unable to convey basic message | Only produces isolated words or memorized utterances | Struggles to produce basic sentence forms |

**s*10 marks to be awarded only if competence level shows flawless expertise in English.**

***0 marks to be awarded when student shows incoherence and gives irrelevant responses.**

**Blue Print for evaluation based on Course Outcomes for SA of each student:**

**Note: Marks are awarded for each student as per the Rubric descriptors.**

| S. No. | Questions based on Course Outcomes | Periods Allocated for practical work | Marks Wise Distribution of Weightage | Marks allotment for each Student in the Rubric* | | | | Mapping of COs |
|---|---|---|---|---|---|---|---|---|
| | | | | Poor 0-2 | Fair 3-5 | Competent 6-8 | Good 9-10 | |
| 1 | Describe the given object in a minute | 6 | 10 | | | | | CO 2 |
| 2 | Exchange ideas/ views in a group discussion on _____ issue (academic, technical or social ) | 6 | 10 | | | | | CO1, CO 2 |
| 3 | Present your ideas /opinions on the given issue/ topic (individual to an audience) | 9 | 10 | | | | | CO1, CO2, CO 3 |
| 4 | Role play an imaginary work-place situation | 6 | 10 | | | | | CO1, CO2, CO 3 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 5 | Individual interaction with the Examiner duly submitting Resume ( Facing the Interview) – Introducing oneself and answering questions | 12 | 10 | | | | | CO1, CO2, CO 3 |
| 6 | *Listen to and comprehend any audio communication/ content | 6 | 10 | | | | | CO1, CO2, CO 3 |
| TOTAL | | 45 | 60 | | | | | |

***Listen to and comprehend the given audio content**: Giving the Students time to read the questions (Fill in the Blanks, Select from Alternatives, True or False, Table fill, etc.) in chunks before listening to audio inputs also played in chunks.

**Blue Print for evaluation based on Course Outcomes for Formative Assessment:**

**Note: Every Question based on CO has to be given marks for the following parameters in the rubric.**

- Fluency and Coherence
- Lexical Resource
- Grammatical Range and Accuracy

| S. No. | Questions based on Course Outcomes | Periods Allocated for practical work | Marks Wise Distribution of Weightage | Marks allotment for each Student in the Rubric* | | | | Mapping of COs |
|---|---|---|---|---|---|---|---|---|
| | | | | Poor 0-2 | Fair 3-5 | Competent 6-8 | Good 9-10 | |
| **Formative Assessment - 1** | | | | | | | | |
| 1 | Describe the given object in a minute | 3 | 10 | | | | | CO 2 |
| 2 | Exchange ideas/ views in a group discussion on _____ issue (academic, technical or social ) | 6 | 10 | | | | | CO1, CO 2 |
| 3 | Present your ideas /opinions on the given issue/ topic (individual to an audience) | 6 | 10 | | | | | CO1, CO2, CO 3 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4 | *Listen to and comprehend any audio communication/ content | 3 | 10 | | | | | CO1, CO2, CO 3 |
| **Total** | | **18** | **40** | | | | | |
| **Formative Assessment -2** | | | | | | | | |
| 1 | Present your ideas /opinions on the given issue/ topic (individual to an audience) | 3 | 10 | | | | | |
| 2 | Role play an imaginary work-place situation | 6 | 10 | | | | | CO1, CO2, CO 3 |
| 3 | Individual interaction with the Examiner duly submitting Resume ( Facing the Interview) – Introducing oneself and answering questions | 15 | 10 | | | | | CO1, CO2, CO 3 |
| 4 | *Listen to and comprehend any audio communication/ content | 3 | 10 | | | | | CO1, CO2, CO 3 |
| **TOTAL** | | **27** | **40** | | | | | |

**Learning Outcomes**

1. **Listening Skills:**
   - 1.1 Listen to audio content (dialogues, interactions, speeches, short presentations) and answer questions based on them
   - 1.2 Infer meanings of words / phrases / sentences / after listening to audio content as mentioned above
2. **Introducing Oneself:**
   - 2.1 Prepare a grid different aspects for presentation about a person / oneself
   - 2.2 Present a 1 or 2 minute introduction of oneself for an audience
3. **Short Presentation:**
   - 3.1 Define an object
   - 3.2 Describe an object, phenomenon, event, people

3.3 Speak on a topic randomly chosen

4. **Group Discussion:**
   - 4.1 Practice Group Discussion. Techniques
   - 4.2 Participate in group discussions
5. **Resume Writing and Cover Letter:**
   - 5.1 Prepare resumes of different sorts – one's own and others.
   - 5.2 Write an effective cover letter that goes with a resume
6. **Interview Skills:**
   - 6.1 Prepare a good Curriculum Vitae
   - 6.2 Exhibit acceptable (Greeting, Thanking, Answering questions with confidence)
7. **Presentation Skills:**
   - 7.1 Prepare Posters, Charts, PPT's on issue of general and technical interest
   - 7.2 Present one's ideas before an audience with confidence using audio visual aids and answer questions that are raised.
8. **Workplace Etiquette:**
   - 8.1 Show positive attitude & adaptability / appropriate body language to suit the work place
   - 8.2 Display basic of etiquette like politeness, good manners.

## COMPUTER HARDWARE & NETWORK MAINTENANCE LAB

| Course Code | Course title | No of periods/ week | Total no of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-409 | Computer Hardware & Network Maintenance Lab | 06 | 90 | 40 | 60 |

| S No | Chapter/ Unit Title | No. of Periods | COs Mapped |
|---|---|---|---|
| 1. | Computer Hardware | 45 | CO1,CO2,CO3 |
| 2. | Computer Networking | 30 | CO3.CO4.CO5 |
| 3. | Network Maintenance through server | 15 | CO4,CO5,CO6 |
| | Total | 90 | |

| | | | |
|---|---|---|---|
| Course Outcomes | Upon completion of the course the student shall be able | | |
| | CO1 | CM-409.1 | Assemble the PC with suitable components. |
| | CO2 | CM-409.2 | Troubleshoot desktop system and individual |
| | CO3 | CM-409.3 | Demonstrate configuring computer network with |
| | CO4 | CM-409.4 | Perform user and group management techniques |
| | CO5 | CM-409.5 | Troubleshoot the computer network. |
| | CO6 | CM-409.6 | Configure any network device. |

**Learning Outcomes:**

1. Identify various mother board Components
2. Perform various operations and modifications required for CMOS setup.
3. Print the summary of your system Hardware and verify for correctness
4. Upgrading memory and verify the effect after upgrading.
5. Hard drive, optical drive installation.
6. How to recover lost data on hard drive.
7. Trouble shooting keyboard and monitor
8. Trouble shoot Printer Problems
9. Installation of Network card.
10. Dis-assembling and assembling of working desktop.
11. Preparing the Ethernet cable for cross and direct connections using crimping tool and test using LAN tester.
12. Installation of a switch and connecting systems to a network switch.
13. Installation of a modem (internal, external or USB) and connecting to internet.
14. Using FTP for uploading and downloading files.
15. Installation and configuring the proxy server for internet access.

16. Setting of particular IP address to an existing terminal system
17. Installation of network operating system
18. Creating and managing user accounts through network server.
19. Configuration of DHCP and DNS
20. Exercise on File/Folder accessing rights for sharing
21. Exercise on remote desktop.
22. Exercise on setting up of VPN on network

**OBJECTIVES AND KEY COMPETENCIES:**

| S. No | Name of the experiment | Objectives | Key Competencies |
|---|---|---|---|
| 1 | Exercise on Identification and familiarization of various components of mother board. | Identification and familiarization of various components of computer system. | ❖ Identify and note down mother board, Components and Chips.<br>❖ Identify various Internal and External slots in the mother board and clean them with blower/ Brush.<br>❖ Practice Inserting and Removing RAM with care.<br>❖ Measure the Output voltages of SMPS. |
| 2 | Exercise on various operations and modifications required for CMOS setup. | Perform various operations and modifications required for CMOS setup. | ❖ Identify location of CMOS battery on mother board.<br>❖ Know how to replace CMOS battery.<br>❖ Identify keyboard key for entering BIOS setup.<br>❖ Setup CMOS settings<br>❖ 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<br>❖ Check whether all the hardware peripherals are working properly or not.<br>❖ Know how to install device drivers<br>❖ Know how to enable and disable hardware peripherals.<br>❖ Print the hardware summary page. |
| 4 | Exercise on Upgrading memory and verify the effect after upgrading. | Upgrading memory and verify the effect after upgrading. | ❖ Know the location of RAM slots<br>❖ Know how to insert or replace RAM chips<br>❖ Check the system properties for confirming the RAM up gradation. |
| 5 | Exercise on Hard drive, | Hard drive, optical drive installation. | Hard drive:<br>❖ Identify the Hard drive slot.<br>❖ Know how to remove power supply |

| | | | |
|---|---|---|---|
| | optical drive installation. | | and SATA cables from hard drive.<br>❖ Unscrew Hard drive from computer case<br>❖ Replace new Hard drive and fix it in computer case<br>❖ Know how to connect power supply cable and SATA cables to Hard drive<br>❖ Check for the working condition of new Hard Drive.<br>Optical drive:<br>❖ Identify the Optical drive slot.<br>❖ Know how to remove power supply and SATA cables from Optical drive.<br>❖ Unscrew Optical drive from computer case<br>❖ Replace new Optical drive and fix it in computer case<br>❖ Know how to connect power supply cable and SATA cables to Optical drive<br>❖ Check for the working condition of Optical drive. |
| 6 | Exercise on recovery of lost data on hard drive. | How to recover lost data on hard drive. | ❖ Verify the available recovery tools of Operating system.<br>❖ Know how to recover lost data on Hard drive using Restore point.<br>❖ Know how to recover lost data on Hard drive using Recovery Image. |
| 7 | Exercise on Trouble shooting keyboard and monitor. | Trouble shooting keyboard and monitor. | ❖ few keys do not work.<br>❖ keyboard does not work at all.<br>❖ Key continuous to repeat after being released.<br>❖ key produces wrong character.<br>❖ Power light (led) does not go on, no picture.<br>❖ Power LED light is on no picture power up.<br>❖ Power on but monitor display wrong character.<br>❖ Monitor flickers has wary lines.<br>❖ Screen goes blank 30 seconds or minute after the keyboard is left untouched |
| 8 | Exercise on Printer Problems | Printer Problems | Laser printer:<br>❖ Printer never leaves warm-up mode.<br>❖ Paper Jam message is displayed<br>❖ Printed messages are distorted<br>❖ RE-filling and replacing cartridge<br>❖ Replacing damaged drum with new one. |

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

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

| | | | |
|---|---|---|---|
| 21 | Exercise on remote desktop. | Exercise on remote desktop. | ❖ Know about remote login<br>❖ Know how to login to the remote desktop |
| 22 | Exercise on setting up of VPN on network | Exercise on setting up of VPN on network | ❖ Know about VPN<br>❖ Know how to configure VPN service |

# V SEMESTER

**DIPLOMA IN COMPUTER ENGINEERING**
**SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2020**

**(V Semester)**

| Sub Code | Name of the Subject | Instruction Periods/Week | | Total Periods Per Semester | Scheme Of Examinations | | | |
|---|---|---|---|---|---|---|---|---|
| | | Theory | Practicals | | Duration (hrs) | Sessional Marks | End Exam Marks | Total Marks |
| **THEORY SUBJECTS** | | | | | | | | |
| CM-501 | Industrial Management and Entrepreneurship | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-502 | Java Programming | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-503 | Software Engineering | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-504 | Internet Of Things | 5 | - | 75 | 3 | 20 | 80 | 100 |
| CM-505 | Python programming | 5 | - | 75 | 3 | 20 | 80 | 100 |
| **PRACTICAL SUBJECTS** | | | | | | | | |
| CM-506 | Java Programming Lab | - | 4 | 60 | 3 | 40 | 60 | 100 |
| CM-507 | Python Programming Lab | - | 4 | 60 | 3 | 40 | 60 | 100 |
| CM-508 | Life Skills | - | 3 | 45 | 3 | 40 | 60 | 100 |
| CM-509 | Project work | - | 6 | 90 | 3 | 40 | 60 | 100 |
| | **Total** | **25** | **17** | **630** | **-** | **260** | **640** | **900** |

Note:CM-501,502,503,506 common with DIT branch

CM-505 common with IT 404

CM-507 common with IT 407

CM-508 common with all branches

## INDUSTRIAL MANAGEMENT AND ENTREPRENEURSHIP

| Course code | Course Title | No. of Periods/ Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-501 | Industrial Management and Entrepreneurship | 5 | 75 | 20 | 80 |

| S. No. | Chapter/Unit Title | No.of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Principles and functions of Industrial Management | 08 | CO1 |
| 2. | Organisation structure & Organisational behaviour | 16 | CO2 |
| 3. | Production Management | 12 | CO3 |
| 4. | Materials Management, Maintenance management & Industrial Safety | 19 | CO4 |
| 5. | Entrepreneurship Development & Quality management. | 20 | CO5 |
| | Total Periods | 75 | |

| | At the end of the course the student will be able to: | | |
|---|---|---|---|
| **Course Outcomes** | CO1 | CM-501.1 | Explain various principles and functions of industrial management. |
| | CO2 | CM-501.2 | Explain organisation structure and organisational behaviour. |
| | CO3 | CM-501.3 | Apply CPM and PERT techniques in production management. |
| | CO4 | CM-501.4 | Apply materials management techniques, maintenance management and industrial safety. |
| | CO5 | CM-501.5 | Describe Entrepreneurship Development and Quality management aspects. |

**Learning outcomes:**

**Principles and functions of Industrial Management**

1.1 Define industry, commerce (Trade) and business.
1.2 Know the need for management.
1.3 Understand the evolution of management
1.4 Understand functions of Management.
1.5 Explain the principles of scientific management.
1.6 Explain the principles of management.
1.7 Differentiate between management and administration.
1.8 Understand the nature of management as a profession
1.9 Differentiate between supervisory, middle and Top level management
1.10 Explain the importance of managerial skills (Technical, Human, Conceptual)

**2.0 Organisation Structure & organisational behaviour**

2.1 Explain the philosophy and need of organisation structure of an industry.
2.2 Discuss the line, staff and Functional organisations
2.3 Explain the Authority and Responsibility Relationships
2.4 List the differences between Delegation and decentralization
2.5 Explain the factors of effective organisation
2.6 Outline the communication process
2.7 State motivational theories.
2.8 State Maslow's Hierarchy of needs.
2.9 List different leadership models.
2.10 Explain the trait theory of leadership
2.11 Explain behavioural theory of Leadership
2.12 Explain the process of decision making.
2.13 Assessing Human resource requirements
2.14 Describe the concept of Job analysis, Job description and specifications
2.15 Explain the process of recruitment, selection, training and development
2.16 List and explain types of business ownerships
2.17 Differentiate between the business ownerships
2.18 State the objectives of Employee participation
2.19 Give the meaning and definition social responsibilities
2.20 Explain corporate social responsibilities

**3.0 Production management**

3.1 Identify the factors of Plant Location
3.2 List the objectives of plant Layout
3.3 State the principles of plant Layouts
3.4 Explain the types of plant Layouts
3.5 Relate the production department with other departments.
3.6 State the need for planning and it's advantages.
3.7 State different types of production.
3.8 Explain the stages of Production, planning and control.
3.9 List the basic methods forecasting
3.10 Explain routing methods.
3.11 Explain scheduling methods.
3.12 Explain dispatching.
3.13 Explain Break Even Analysis
3.14 Define supply chain Management, competitive strategy, Supply chain strategy
3.15 Explain project scheduling.
3.16 Draw CPM and PERT networks.
3.17 Identify the critical path.
3.18 Simple numerical problems on CPM and PERT.

**4.0 Materials Management, Maintenance management & Industrial Safety**

4.1 Explain the importance and functions of materials management in Industry.
4.2 State an expression for inventory control.
4.3 Explain ABC analysis.
4.4 Define safety stock and reorder level
4.5 State an expression for economic ordering quantity.
4.6 State the functions of Stores Management,
4.7 Explain types of store layouts.

4.8 List out stores equipment and stores records.
4.9 Explain general purchasing procedures
4.10 Explain tendering, E-tendering and E-procurement procedures
4.11 List purchase records.
4.12 Explain the Bin card.
4.13 Describe Cardex method.
4.14 List the applications of RFIDin material management
4.15 Explain Objectives and activities of maintenance management
4.16 Explain the importance of maintenance management in Industry.
4.17 Explain the importance of Preventive maintenance
4.18 State the need for scheduled maintenance
4.19 Differentiate between scheduled and preventive maintenance
4.20 Know the principles of 5 s for good housekeeping
4.21 Explain the importance of safety at Work place.
4.22 List the important provisions related to safety.
4.23 Explain hazard and accident.
4.24 List any six different hazards in the Industry.
4.25 Explain any six causes of accidents.
4.26 Explain the direct and indirect causes of accidents.
4.27 Explain the types of emission from process Industries, their effects environment and control
4.28 Describe the principles of solid waste management

**5.0 Entrepreneurship Development & Quality management.**

5.1 Define the word entrepreneur.
5.2 Explain the requirements of an entrepreneur.
5.3 Determine the role of entrepreneurs in promoting Small Scale Industries.
5.4 Describe the details of self-employment schemes.
5.5 Characteristic of successful entrepreneurs
5.6 Explain the method of site selection.
5.7 List the financial assistance programmes.
5.8 List out the organisations that help an entrepreneur
5.9 Know the use of EDP Programmes
5.10 Understand the concept of make in India, Zero defect and zero effect
5.11 Understand the importance for startups
5.12 Explain the conduct of demand surveys
5.13 Explain the conduct of a market survey
5.14 Evaluate Economic and Technical factors.
5.15 Prepare feasibility report study
5.16 Explain the concept of quality.
5.17 List the quality systems and elements of quality systems.
5.18 State the principles of quality Assurance.
5.19 Explain management information system (MIS)
5.20 Explain the basic concepts of TQM
5.21 State the Pillars of TQM
5.22 List the evolution of ISO standards.
5.23 Explain ISO standards and ISO 9000 series of quality systems.
5.24 List the beneficiaries of ISO 9000.
5.25 Explain the concepts of ISO 14000
5.26 Give the overview of PDCA cycle
5.27 State Kaizen strategy.

**Course Content**

1. **Principles and functions of Industrial Management**

   Introduction: Industry, Commerce and Business; Definition of management; Functions of management - Principles of scientific management by F.W.Taylor, Principles of Management by Henry Fayol; Administration and management; levels of management; managerial skills;

2. **Organisation Structure & organisational behaviour**

   Organizing - Process of Organizing; Line, Staff and functional Organizations, Decentralization and Delegation, Communication, Motivational Theories; Leadership Models; Human resources development; recruitment selection training and development, Forms of Business ownerships: Types – Sole proprietorship, Partnership, Joint Stock Companies, Cooperative Organization; objectives of employee participation, Corporate Social responsibility;

3. **Production management**

   Definition and importance; objectives and principles of plant layout, Plant location and types of layout; Types of production -job, batch and mass; production Planning and Control: basic methods of forecasting, routing, scheduling, dispatching and follow up; Break even analysis; Project scheduling; Application of CPM and PERT techniques; simple numerical problems;

4. **Materials Management, Maintenance management & Industrial Safety**

   Materials in industry, Importance and functions of materials management, Basic inventory control model, ABC Analysis, Safety stock, re-order level, Economic ordering quantity, Stores Management: Stores layout, stores equipment, Stores records, purchasing procedures, tendering, e-tendering, e-procurement; purchase records, Bin card, Cardex, RFID Applications in materials management, Objectives and importance of maintenance management, Different types of maintenance, Schedules of preventive maintenance, scheduled maintenance Advantages of preventive maintenance, Advantages of scheduled maintenance, Importance of Safety at work places; industrial hazards; Causes of accidents.5S Principles

5. **Entrepreneurship Development& Quality Management.**

   Definition of Entrepreneur; Requirements of entrepreneur, Role of Entrepreneur; Entrepreneurial Development, Details of self-employment scheme, financial assistant programmes, organisations that help entrepreneurs (SSI, MSME, DIC, Banks) Concept of Make In India, ZERO defect, Zero Effect, Concept of Start-up Company, Demand survey and Market survey; Preparation of Feasibility study reports

   Concept of quality, quality systems and its terms, principles of quality assurance, Introduction to Management Information System (MIS); Total Quality Management (TQM), ISO 9000 series , ISO-14000, Deming's PDCA Cycle (Plan, Do, Check and Action). Kaizen Strategy (continuous improvement)

***REFERENCE BOOKS***


1. Industrial Engineering and Management -by O.P Khanna
2. Production Management- by Buffa.
3. Engineering Economics and Management Science - by Banga &Sharma.
4. Personnel Management by Flippo.
5. Production and Operations Management –S.N. Chary
6. Converging_Technologies_for_Smart_Environments_ and_Integrated_Ecosystems_IERC_Book_ Open_Access_2013pages-54-76
7. Supply Chain Management –Sunil Chopra and Meindl, PHI publishers

8 5 S made easy by David Visco


**MODEL BLUE PRINT**

| S.No. | Chapter/ Unit title | No.of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Principles and functions of Industrial Management | 08 | 11 | 3 | 8 | | | 1 | 1 | | | CO1 |
| 2 | Organisation structure & Organisational behaviour | 16 | 14 | 3 | 11 | | * | 1 | 2 | | * | CO2 |
| 3 | Production Management | 12 | 14 | 3 | 11 | | * | 1 | 2 | | * | CO3 |
| 4 | Materials Management, Maintenance management & Industrial Safety | 19 | 14 | 6 | 8 | | * | 2 | 1 | | * | CO4 |
| 5 | Entrepreneurship Development & Quality management. | 20 | 17 | 9 | 8 | | * | 3 | 1 | | * | CO5 |
| | **Total *** | **75** | **70 +10*** | **24** | **46** | | **10*** | **8** | **7** | | **1** | |

Note: Part-C: 10 marks single analytical question may be chosen from chapters marked with *.

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

| Unit Test | Learning outcomes to be covered |
|---|---|
| Unit test-1 | From 1.1 to 3.18 |
| Unit test-2 | From 4.1 to 5.27 |

## JAVA PROGRAMMING

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-502 | **Java Programming** | 5 | 75 | 20 | 80 |

| SL.No. | Chapter/Unit Title | No.of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Basics of java and overloading | 12 | CO1,CO2 |
| 2. | Concepts of inheritance, overriding, Interfaces and Packages | 14 | CO2 |
| 3. | I/O Streams and Collections. | 14 | CO3 |
| 4. | Exception handling and Multi-threaded programming. | 16 | CO4 |
| 5. | Applets, AWT and Event Handling | 19 | CO4,CO5 |
| | Total Periods | 75 | |

| | At the end of the course the student will be able to: | | |
|---|---|---|---|
| **Course Outcomes** | CO1 | CM-502.1 | Explain the fundamental concepts of JAVA and Overloading. |
| | CO2 | CM-502.2 | Apply reusability features like inheritance and polymorphism. |
| | CO3 | CM-502.3 | Analyze modular design for real time applications by using packages concept in projects. |
| | CO4 | CM-502.4 | Apply multithreading concepts to implement multitasking and multi programming applications. |
| | CO5 | CM-502.5 | Design effective dynamic user interface for any front end applications using Applets and events. |

**Learning Outcomes:**

**1.0 Basics of java and overloading**

1.1 Describe history and importance of Java in Internet programming.
1.2 Compare Java & C++.
1.3 Explain features of Java.
1.4 Define Byte codes of Java and JVM.
1.5 Give the steps to write and execute a Java program.
1.6 Explain primitive data types of java.
1.7 Describe conversion and casting features.
1.8 Explain one-dimensional and two–dimensional arrays and give example programs.
1.9 Describe how to create classes and objects.
1.10 Apply the Usage of new operator and methods.
1.11 Explain usage of constructors with example programs.
1.12 Apply method overloading and constructor overloading in applications.
1.13 Describe usage of 'this' pointer,

1.14 Explain Usage of static in variables, methods, and blocks with example.
1.15 Know about string classes.
1.16 Usage of command-line arguments.
1.17 Describe the importance of final keyword.

**2.0 Concepts of inheritance, overriding, Interfaces and Packages**

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

**3.0 I/O Streams and Collections.**

3.1 List different types of I/O streams.
3.2 Explain how to read and write data through console input and output streams and write a sample program.
3.3 Explain how to use Data Input Stream and Data Output Stream to access primitive data types and write a sample program.
3.4 Explain various file access operations by using File Streams and write a sample program.
3.5 What is a collection framework and Hierarchy of collection framework and write a sample program.
3.6 Describe Array List, Linked List
- 3.6.1 Constructors
- 3.6.2 Methods
- 3.6.3 Comparisons between above two classes.
- 3.6.4 Sample programs

3.7 Explain Iterator and List Iterator interface methods and write a sample program.
3.8 Describe List interface and Hash Set and Hash Table class
- 3.8.1Constructors
- 3.8.2Methods
- 3.8.3 Sample programs.

3.9 Describe Map interface and HashMap class for the following
- 3.8.1Constructors
- 3.8.2Methods
- 3.8.3 Sample programs

3.10 Explain Enum Set and Enum Map classes and write a sample program..

**4.0 Exception handling and Multi-threaded programming.**

4.1 Describe sources of errors.
4.2 Give advantages of Exception handling.
4.3 Explain types of exceptions Checked and Unchecked
4.4 Write sample programs to make use of Try, Catch, Finally, Throw, Throws
4.3 Explain concept of Multi-catch statements with example.

4.4 Explain how to write nested try in exception handling with example.
4.5 Describe built in exceptions.
4.6 Describe multithreading.
4.7 Explain Thread life cycle and states
4.5 Explain how to Creating single thread with example program.
4.6 Explain how to Creating multi thread with example program.
4.7 Illustrate thread priorities in multiple threads with an example.
4.8 Describe the concept of synchronization with example program.
4.9 Explain Inter thread communication with example program.
4.10 Explain dead lock.

**5.0 Applets, AWT, Event Handling.**

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

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

**COURSE CONTENTS**

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

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

**3. Concepts of I/O Streams and Collections:** I/O streams-Accessing data through console input and output-DataInputStream- DataOutput Stream –Collection Frame

work-Array List-Linked List-Iterator and List Interface-Hash table-Hash Map-Enum Set-Enum Map

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

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

**REFERENCE BOOKS**


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


**MODEL BLUE PRINT**

| S.No. | Chapter/Unit title | No.of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Features and Basics of java | 14 | 14 | 3 | 11 | | | 1 | 2 | | | CO1 |
| 2 | Concepts of overloading, inheritance, overriding | 13 | 14 | | 14 | | * | | 3 | | * | CO2 |
| 3 | Concepts of I/O Streams, Interfaces and Packages | 13 | 14 | 3 | 3 | 8 | * | 1 | 1 | 1 | * | CO3 |
| 4 | Exception handling and Multi threaded programming. | 16 | 14 | | 6 | 8 | * | | 2 | 1 | * | C04 |
| 5 | Applets, AWT and Event Handling | 19 | 14 | 3 | 11 | | * | 1 | 2 | | * | CO5 |
| | **Total** | **75** | **70+10*** | **15** | **39** | **16** | **10*** | **3** | **10** | **2** | **1** | |

Note: Part-C: 10 marks single analytical question may be chosen from chapters marked with *.

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

| Unit Test | Learning outcomes to be covered |
|---|---|
| Unit test-1 | From 1.1 to 3.5 |
| Unit test-2 | From 3.6 to 5.14 |

## SOFTWARE ENGINEERING

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-503 | Software Engineering | 5 | 75 | 20 | 80 |

| Sl.No. | Chapter/Unit Title | No.of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Basics of Software Engineering Designs & Life Cycle Models | 10 | CO1 |
| 2. | Software Project Management | 18 | CO2 |
| 3. | Requirement Analysis & Specifications | 10 | CO1,CO3 |
| 4. | Software Design, Coding | 22 | CO1,CO3,CO5 |
| 5. | Software testing, Debugging, Reliability, Quality Management & Maintenance | 15 | CO4,CO5 |
| | Total Periods | 75 | |

| | At the end of the course the student able to : | | |
|---|---|---|---|
| **Course Outcomes** | CO1 | CM-503.1 | Explain Software life cycle models and basics of software engineering. |
| | CO2 | CM-503.2 | Describe Software Project Management |
| | CO3 | CM-503.3 | Prepare SRS document |
| | CO4 | CM-503.4 | Apply Design ,coding& testing techniques. |
| | CO5 | CM-503.5 | Apply quality and reliability metrics |

**Learning Outcomes:**

**1.0 Basics of Software Engineering Designs & Life Cycle Models**

1.1 Study the Evolution and Impact of the Software Engineering

1.1.1 Evolution of an Art to an Engineering Discipline

1.1.2 Explain Solution to the Software Crisis?

1.2 Write the difference between Programs and Software Products

1.3 Explain the following

1.3.1 Early Computer Programming

1.3.2 High Level Language Programming

1.3.3 Control Flow-Based Design

1.3.4 Data Structure-Oriented Design

1.3.5 Data Flow-Oriented Design

1.3.6 Object Oriented Design

1.3.7 Other Developments

1.4 Explain the Software Life Cycle Models

1.4.1 Classical Waterfall Model

1.4.2 Iterative Water fall Model

1.4.3 Prototyping Model

1.4.4 Evolutionary Model

1.4.5 Spiral Model

1.4.6 Comparison of Different Life Cycle Models

**2.0 Software Project Management**

2.1 Explain the Responsibilities of a Software Project Manager

2.1.1 Job Responsibilities of a Software Project Manager

2.1.2 Skills Necessary for Software Project Management

2.2 Know about Software Project Planning

2.3 Explain SPMP Document.

2.4 State the Metrics for Project Size Estimation: Lines of Code, Function Point Metric

2.5 Explain the three Project Estimation Techniques

2.5.1 Empirical Estimation Technique

2.5.2 Heuristic Technique

2.5.3 Analytical Estimation Technique

2.6. Explain the two different works of Staffing Level Estimations

2.6.1 Norden's Work

2.6.2 Putnam's Work

2.7 Explain four ways of Scheduling

2.7.1 Work Break Down Structure

2.7.2 Activity Networks and Critical Path Method

2.7.3 Gantt Charts

2.7.4 PERT Charts

2.8 Describe how to do Staffing – " Who is a Good Software Engineer?"

2.9 Explain Risk Management

2.9.1 Risk Identification

2.9.2 Risk Assessment

2.9.3 Risk Containment

**3.0 Requirement Analysis & Specifications**

3.1 Explain Requirements Gathering and Analysis.

3.2 Explain Software Requirement Specifications (SRS).

3.2.1Contents of the SRS Document

3.2.2 Functional Requirements

3.2.3 How to identify the Functional Requirements

3.3. Documenting the Functional Requirements

3.4 Explain requirements Traceability.

3.5. List Characteristics of a Good SRS Document

3.6. Give Examples of Bad SRS Document

3.7. Explain Organization of the SRS Document

**4.0 Software Design, Coding & Testing**

4.1 What is a good Software Design?

4.2 Define and Classify Cohesion and Coupling

4.2.1 Classification of Cohesiveness

4.2.2 Classification of Coupling

4.3 Approaches of Software Design

4.3.1 Explain Function-Oriented Design

4.3.2 Explain Object-Oriented Design

4.3.3 Function-Oriented vs Object-Oriented Design

4.4. User Interface Design

4.4.1 List the Characteristics of a good User Interface.

4.4.2 Explain the Basic Concepts - User Guidance and Online Help - Mode Based vs Modeless Interface -Graphical User Interface (GUI) vs Text-Based User Interface.

4.4.3 List the two types of User Interfaces - Command Language Based Interface - Menu Based Interface - Direct Manipulation Interfaces.

4.4.4 Explain Component Based GUI Development Window System and Types of Widgets.

4.5. Unified Modelling Language

4.5.1. List the goals of UML

4.5.2. State the role of UML in Object oriented Design

4.5.3.List the building blocks of UML : Things, Relationships, and Diagrams

4.5.4. Explain the UML building blocks

4.5.5.List the different symbols used in UML notation

4.5.6. Classify and list standard UML diagrams

4.6. State the purpose of Class diagram and draw simple class diagrams.

4.7. Usecase Diagram

4.7.1. Define the term Usecase

4.7.2. Know the purposes of Usecase Diagram

4.7.3. Explain to draw the Usecase Diagram

4.8. Interaction Diagram

4.8.1. State the purposes of Interaction diagram

4.8.2. List the types of interaction diagrams:

Sequence Diagram

and Collaboration Diagram

4.8.3. Illustrate drawing the Interaction Diagrams

**5.0 Testing, Debugging, Reliability, Quality Management & Maintenance**

5.1. Explain the following Concepts of Software Coding and Testing.

5.1.1. Coding Standards and Guidelines - Code Review- Code Walk-Throughs - Code Inspection.

5.1.2 Clean Room Testing - Software Documentation- Software Testing

5.1.3 What is testing?

5.1.4 Differentiate Verification and Validation.

5.1.5 List 3 Designs of Test Cases.

5.1.6 Differentiate Testing in the Large vs Testing in the Small.

5.1.7 Explain Unit Testing - Driver and Stub Modules.

5.1.8 Explain about Black box Testing and White Box Testing.

5.1.9 Explain Open source software testing tools – Selenium, Bugzilla

5.2 Concepts of Debugging

5.2.1 Explain the Debugging Approaches.

5.2.2 List the Debugging Guidelines.

5.3 List and Explain Program Analysis Tools (Static Analysis Tools, Dynamic Analysis Tools)

5.4 List and Explain types of Integration Testing.

5.5 Explain System Testing.

5.6 Explain Performance Testing.

5.7. Understand the concept of Software Reliability

5.7.1 Differentiate Hardware Reliability and Software Reliability

5.7.2 List the different Reliability Metrics

5.7.3 Understand the Reliability Growth Modelling

5.8. Define Statistical Testing

5.9. Define Software Quality

5.10. Explain Software Quality Management System

5.11 Explain the Evolution of Quality Systems.

5.12. Define SEI Capability Maturity Model

**COURSE CONTENT**

1. Introduction to Software Engineering- Life Cycle Models.

2. Software Project Management- Responsibilities of a Software Project Manager- Project planning – Metrics-Project Estimation Techniques- Staffing Level Estimation - Scheduling – Risk Management

3. Requirement Analysis and Specification: Requirement Gathering and Analysis - SRS document

4. Software Design , Coding and Testing: Good software design, Cohesion and Coupling, Software Design Approaches, User interface Design, Software Coding and Goals of UML - Role of UML in Object oriented Design - Building blocks of UML : Things, Relationships, and Diagrams - Symbols used in UML notation - Classify and list standard UML diagrams - Class diagram, purposes of class diagram, draw the class diagram - Use case diagram, define the term Use case, purposes of Use case diagram, draw the Use case diagram - Interaction diagram, purposes of Interaction diagram, the types of interaction diagrams : Sequence diagram and Collaboration diagram, draw the Interaction diagrams.

5. Software Testing, Debugging, Reliability, Quality Management and maintenance – Testing, Debugging software Reliability- Statistical Testing, Software Quality, Software Quality Management System, SEI capability Maturity Model

**REFERENCE BOOKS**

1. Fundamentals of Software Engineering – Rajib Mall ( PHI)Second Edition.

2. Software Engineering - Jawadekar (TMH)

3. Software Engineering Concepts - Fairley (TMH)

4. Pankaj Jalote international approach to software engineering ":2nd edition

Narosal publishing house 1997

5. http://www.tutorialspoint.com/uml/
6. The Unified Modelling Language User guide…Grady Booch

## MODEL BLUE PRINT

| S. No | Chapter/Unit title | No.of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Basics of Software Engineering Designs & Life Cycle Models | 10 | 11 | 3 | 8 | | | 1 | 1 | | | C01 |
| 2 | Software Project Management | 18 | 14 | 3 | 3 | 8 | * | 1 | 1 | 1 | * | CO2 |
| 3 | Requirement Analysis & Specifications | 10 | 11 | 3 | 8 | | * | 1 | 1 | | * | CO1,C03 |
| 4 | Software Design, Coding | 22 | 17 | 6 | 11 | | * | 2 | 2 | | * | CO1,CO3,CO5 |
| 5 | Software testing, Debugging, Reliability, Quality Management & Maintenance | 15 | 17 | 6 | 11 | | | 2 | 2 | | | CO4,CO5 |
| | **Total** | **75** | **70+10*** | 21 | 41 | 8 | 10* | 7 | 7 | 1 | 1* | |

Note: Part-C: 10 marks single analytical question may be chosen from chapters marked with *.

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

| Unit Test | Learning outcomes to be covered |
|---|---|
| Unit test-1 | From 1.1 to 3.7 |
| Unit test-2 | From 4.1 to 5.12 |

## INTERNET OF THINGS

| Course code | Course Title | No. of Periods/ Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-504 | **Internet of Things** | 5 | 75 | 20 | 80 |

| S.No. | Chapter/Unit Title | No.of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Introduction of IOT | 10 | CO1 |
| 2. | Data Protocols | 15 | CO1,CO2 |
| 3. | Communication Technologies | 18 | CO1,CO3 |
| 4. | Wireless Sensor Networks | 22 | CO4 |
| 5. | Cloud Computing | 10 | CO1,CO5 |
| | Total Periods | 75 | |

| | | | |
|---|---|---|---|
| **Course Outcomes** | At the end of the course the student will be able to: | | |
| | CO1 | CM-504.1 | Explain the basic concepts like usage of sensors ,components and frequently used technologies of IoT from a global context |
| | CO2 | CM-504.2 | Apply Data protocols of IoT |
| | CO3 | CM-504.3 | Describe various communication technologies of IOT |
| | CO4 | CM-504.4 | Illustrate the use of sensor networks in applications of various domains |
| | CO5 | CM-504.5 | Explain Integrating IOT with cloud computing |

**Learning Outcomes:**

1: Introduction of IOT

1.1. INTRODUCTION:

1.1.1. Define IOT and list its Features

1.1.2. List the components of IoT : hardware, software, technology and protocols

1.1.3. List Applications ,various Technologies of IOT

1.1.4. List advantages and disadvantages of IoT

1.1.5. Describe various connecting technologies

1.1.6. Sensors

1.1.6.1. Need of sensor

1.1.6.2. Features of Sensors

1.1.6.3. Classify Sensors based on output, on data types

1.1.7. Define actuator and list its types

1.1.8. List and explain functional Components of IOT

1.1.9. Explain service oriented architecture of IOT

1.1.10. List IOT challenges

1.2 Various Connectivity Technologies in IOT:

1.2.1 6LoWPANs Technologies

1.2.1.1 Features

1.2.1.2 Addressing

1.2.1.3 List and explain different packet formats

1.2.1.4 Explain 6LoWPAN protocol stack architecture

1.2.2 List and Explain Routing protocols(LOADng, RPL)

1.2.3 RFID Technologies

1.2.3.1 State the purpose of RFID

1.2.3.2 List the features

1.2.3.3 Explain Working principle

1.2.3.4 Applications

## 2. DATA PROTOCOLS

2.1. Message Queue Telemetry Transport(MQTT)

2.1.1. Define and explain MQTT

2.1.2. List components, Methods, Applications

2.1.3. Define and explain Secure MQTT

2.2. Constrained Application Protocol (CoAP)

2.2.1. Explain CoAP

2.2.2. Explain CoAP message types

2.3. Extensible Messaging and Presence Protocol(XMPP)

2.3.1. List Features of XMPP

2.3.2. Explain XMPP

2.3.3. Describe core XMPP Technologies

2.3.4. List applications of XMPP

2.4. Advanced Message Queuing Protocol (AMQP)

2.4.1. List Features of AMQP

2.4.2. Explain AMQP in detail

2.4.3. List applications of XMPP

## 3. Communication Technologies

3.1. IEEE 802.15.4

3.1.1. List features of IEEE 802.15.4

3.1.2. Explain IEEE 802.15.4

3.1.3. List IEEE 802.15.4 Variants

3.1.4. List and explain IEEE 802.15.4 Types

3.2. ZIGBEE

3.2.1. What is ZIGBEE

3.2.2. List features, components, different topologies,types, applications of ZIGBEE

3.2.3. Explain different topologies of ZIGBEE

3.2.4. Explain ZIGBEE types

3.3. Near field communication(NFC)

3.3.1. What is NFC

3.3.2. List types and applications of NFC
3.3.3. Explain working principle of NFC
3.3.4. Describe modes of operation of NFC

3.4. Bluetooth
3.4.1. What is the purpose of Bluetooth
3.4.2. List features, functions, applications of Bluetooth
3.4.3. Explain Bluetooth technology in detail
3.4.4. Describe Pico Net

**4. Wireless Sensor Networks**

4.1. What is Wireless Sensor Network and list its Applications

4.2. Explain types of Sensor networks: Single Source Single Object Detection, Single Source Multiple Object Detection, Multiple Source Single Object Detection, Multiple Source Multiple Object Detection
4.3. What are the Challenges in Wireless Sensor Networks
4.4. Explain node Behaviour in WSNs
4.5. Explain Information theoretic self-management in WSN
4.6. Applications of WSN
4.7. Explain Wireless Multimedia Sensor Networks(WMSN)
4.8. Explain Stationary Wireless Sensor Networks
4.9. Explain Mobile Wireless Sensor Networks
4.10. What is Machine to Machine Communications(M 2 M)
4.11. Lists applications ,features of M2M
4.12. List and explain M2M sensor nodes
4.13. Explain Role of IOT in automation of the following applications
4.13.1. Health care applications
4.13.2. Smart Home,
4.13.3. Smart Cities,
4.13.4. Smart class rooms
4.13.5. Smart Energy
4.13.6. Smart Transportation and Mobility
4.13.7. Smart Factory

**5. Cloud Computing**

5.1. What is cloud computing ,state its importance and Recent Trends in Computing
5.2. Evolution of cloud computing
5.3. Draw and explain NIST Visual Model of Cloud Computing
5.4. List features of Cloud computing
5.5. Explain components of cloud computing
5.6. Describe different service models in cloud computing
5.7. Compare different service models
5.8. Explain different deployment models or types of clouds
5.9. Differentiate between private cloud and public cloud
5.10. Compare traditional data centre and Cloud storage
5.11. Describe how data is managed in cloud(DBaaS)
5.12. Explain security concepts in cloud
5.13. What is cloud simulator and List different types

**COURSE CONTENT**

**UNIT1 : Introduction of IOT**

INTRODUCTION to IOT – Definition – Applications – Technologies – Sensor features –Types – Actuator list – Components – 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- Role of IOT in automation of applications - Health care -Smart Home-Smart Cities

**UNIT5 : Cloud Computing**

Cloud Computing-Evolution-NIST Visual Model-features -components - service models-Compare different service models-deployment models -Differentiate between private cloud - Compare traditional data centre and Cloud storage-DBaaS -security concepts - cloud simulators- applications

**REFERENCE BOOKS**

1)https://onlinecourses-archive.nptel.ac.in/

2) “Internet of Things: A Hands-On Approach”, Vijay Madisetti, ArshdeepBahga, Orient BlackswanPvt., Ltd., New Delhi, 2015.
3) "Fundamentals of Wireless Sensor Networks: Theory and Practice", WaltenegusDargie, Christian Poellabauer, A John Wiley and Sons, Ltd., Publication, 2010.
4) “Internet of Things”, Jeeva Jose, (ISBN: 978-93-86173-591) KBP House,1st edition,2018.

5) Interconnecting Smart Objects with IP: The Next Internet, Jean-Philippe Vasseur, Adam Dunkels, Morgan Kuffmann

6) Designing the Internet of Things , Adrian McEwen (Author), Hakim Cassimally

7) Internet of Things: Converging Technologies for Smart Environments and Integrated Ecosystems, Dr.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

**MODEL BLUE PRINT**

| S. No. | Chapter/Unit title | No.of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Introduction of IOT | 10 | 14 | 3 | 11 | | | 1 | 2 | | | CO1 |
| 2 | DATA PROTOCOLS | 15 | 14 | 3 | 11 | | * | 1 | 2 | | * | CO1,CO2 |
| 3 | Communication Technologies | 20 | 14 | | 14 | | * | | 3 | | * | CO1,CO3 |
| 4 | Wireless Sensor Networks | 20 | 14 | 3 | 11 | | * | 1 | 2 | | * | CO4 |
| 5 | Cloud Computing | 10 | 14 | 3 | 11 | | | 1 | 2 | | | CO1,CO5 |
| | **Total *** | **75** | **70 +10*** | **12** | **58** | | **10*** | **4** | **11** | | **1*** | |

Note: Part-C: 10 marks single analytical question may be chosen from chapters marked with *.

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

| Unit Test | Learning outcomes to be covered |
|---|---|
| Unit test-1 | From 1.1 to3.2 |
| Unit test-2 | From 3.3 to 5.13 |

## PYTHON PROGRAMMING

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-505 | **Python Programming** | 5 | 75 | 20 | 80 |

| Sl.No. | Chapter/Unit Title | No.of Periods | CO's Mapped |
|---|---|---|---|
| 1. | Python Programming Introduction | 10 | CO1 |
| 2. | Control Flow and Loops | 15 | CO2 |
| 3. | Functions and Arrays | 15 | CO3 |
| 4. | Data Structures | 15 | CO4 |
| 5. | Object Oriented Programming in Python and File Handling and Exception Handling | 20 | CO5 |
| | Total Periods | 75 | |

| | | | |
|---|---|---|---|
| **Course Outcomes** | At the end of the course the student will be able to: | | |
| | CO1 | CM-505.1 | Explain Basic constructs like operators, expressions and components of python programming as well as Editing and Debugging |
| | CO2 | CM-505.2 | Write Python programs using Control statements, Loops |
| | CO3 | CM-505.3 | Write python programs using Functions and arrays |
| | CO4 | CM-505.4 | Develop Python programs using Data structures |
| | CO5 | CM-505.5 | Develop Python application programs using OOP Concept, FILES, Exceptions |

**Learning Outcomes:**

**1.0 Introduction**

1.1. History of Python.
1.2. List Python features.
1.3. Explain Applications of Python.
1.4. Describe Python Integrated Development and Learning Environment (IDLE)
1.5. Give the process of Running Python Scripts.
1.6. Explain Identifiers, Keywords, Indentation, Variables
1.7. Explain various data types (Int, float, Boolean, string, and list)
1.8. Explain declaration, initialization of variables.
1.9. Explain Input and Output statements.
1.10. Explain formatted input output.
1.11. State the usage of comments
1.12. Explain various Operators.
1.13. Explain Boolean values.
1.14. Explain Operator precedence rules.
1.15. State the purpose of modules.
1.16. Define functions.
1.17. List types of functions.(Built-in, User defined)
1.18. Explain Built-in Functions.
1.19. Give the Steps in Develop a simple python program and execution.

**2.0 Control Flow and Loops**

2.1. Explain various Control Flow constructs.
- 2.1.1 If
- 2.1.2 If-Else
- 2.1.3 if-elif-else

2.2 Explain various Loop Statements.

- 2.2.1 for Loop
- 2.2.2 while loop
- 2.2.3 break
- 2.2.4 continue
- 2.2.5 pass

**3.0 Functions and Arrays**

3.1 Introduction
3.2 Function Arguments: Default arguments, Variable Length arguments
3.3 Anonymous Functions
3.4 Return Statement
3.5 Scope of variables: Local Variables and Global Variables
3.6 Explain creation of modules.
3.7 Explain importing of modules.
3.8 Python Variable: Namespace and scoping
3.9 Python Packages
3.10 Explain Strings: String slices, immutability
3.11 Explain String functions and methods.
3.12 Explain about String module.
3.13 Explain about Python Arrays.
3.14 Explain accessing of elements in an Array.
3.15 Explain Array methods.

**4.0 Data Structures**

4.1. Explain Python Lists.
4.2. Describe Basic List Operations.
4.3. Explain List Slices.
4.4. Explain List methods.
4.5. Explain List loop.
4.6. Explain mutability.
4.7. Explain aliasing.
4.8. Explain Cloning lists.
4.9. Explain List parameters.
4.10. Explain List comprehension.
4.11. Tuples.
- 4.11.1. Explain Tuple assignment.
- 4.11.2. Explain Tuple as return value.
- 4.11.3. Explain Tuple Comprehension

4.12. Dictionaries
- 4.12.1. Explain creation of dictionary/assignment.
- 4.12.2. Explain Operations and methods.
- 4.12.3. Explain Dictionary Comprehension.

4.13. Explain Sets.

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

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

**COURSE CONTENT**

**UNIT – I:**

**Introduction:** Introduction to Python and installation, data types: Int, float, Boolean, string, and list; variables, Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Boolean values, expressions, statements, precedence of operators, comments; modules, functions--- function and its use, flow of execution, parameters and arguments.

**UNIT – II:**

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

**UNIT – III:**

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

**UNIT – IV:**

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

**UNIT – V:**

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

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

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

**REFERENCE BOOKS**


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


**Model Blue Print:**

| S.No. | Chapter/Unit title | No.of periods | Weightage Allocated | Marks Wise Distribution of Weightage | | | | Question wise Distribution of Weightage | | | | CO's Mapped |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | R | U | Ap | An | R | U | Ap | An | |
| 1 | Python Programming Introduction | 10 | 11 | 3 | 8 | | | 1 | 1 | | | CO1 |
| 2 | Control Flow and Loops | 15 | 14 | 3 | 8 | 3 | * | 1 | 1 | 1 | * | CO2 |
| 3 | Functions and Arrays | 15 | 14 | 3 | 3 | 8 | * | 1 | 1 | 1 | * | CO3 |
| 4 | Data Structures | 15 | 14 | 3 | 3 | 8 | * | 1 | 1 | 1 | * | CO4 |
| 5 | Object Oriented Programming in Python and File Handling and Exception Handling | 20 | 17 | 3 | 6 | 8 | * | 1 | 2 | 1 | * | CO5 |
| | **Total *** | **75** | **70+10*** | **20** | **23** | **27** | 10* | 5 | 6 | 4 | 1* | |

Note: Part-C: 10 marks single analytical question may be chosen from chapters marked with *.

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

| Unit Test | Learning outcomes to be covered |
|---|---|
| Unit test-1 | From 1.1 to 3.7 |
| Unit test-2 | From 3.8 to 5.9 |

## JAVA PROGRAMMING LAB

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-506 | **Java Programming Lab** | 4 | 60 | 40 | 60 |

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

| | At the end of the course the student will be able to: | | |
|---|---|---|---|
| Course Outcomes | CO1 | CM-506.1 | Perform object oriented programming concepts in problem solving, syntax and semantics of object oriented paradigm. |
| | CO2 | CM-506.2 | Design applications with reusability features like inheritance and polymorphism. |
| | CO3 | CM-506.3 | Develop modular programs for real time applications by using streams and collections. |
| | CO4 | CM-506.4 | Develop programs using threads and multithreading concepts |
| | CO5 | CM-506.5 | Design effective dynamic user interface for any front end applications using Applets and events. |

**Learning Outcomes**

1. Exercise programs using Java built-in data types.
2. Exercise programs on conditional statements and loop statements.
3. Exercise programs on I/O Streams
   i) Reading data through Keyboard
   ii) Reading and writing Primitive data types using DataInputStream and DataOutputStream.
   iii) Perform Reading and Writing operations on files using File Streams.
4. Exercise programs on Strings.
5. Exercise program to create class and objects and adding methods.
6. Exercise programs using constructors and construction over loading.
7. Exercise programs on command line arguments.

i) Input as command line arguments and perform operation on that data.
ii) Input as command line arguments and update manipulated data in Files.

8. Exercise programs using concept of overloading methods.
9. Exercise programs on inheritance.
10. Write a program using the concept of method overriding.
11. Exercise on packages.
    i) Creation of packages
    ii) Design module to importing packages from other packages.
12. Exercise programs on interfaces.
13. Exercise programs on Collections.
    i) Write a java program to search a student mark percentage based on pin number using Array list.
    ii) Write a java program to create linked list to perform delete, insert, and update data in linked list with any application.
    iii) Write a java program to search an element from hash table.
    iv) Write a java program to sorting employee details using hash map.
14. Exercise on exception handling.
    i) Programs on try, catch and finally.
    ii) Programs on multiple catch statements
    iii) Programs on nested try statements.
15. Exercise on multithreading
    i) Programs on creation of single and multiple threads.
    ii) Programs on adding priorities to multiple threads.
    iii) Programs on Inter thread communication.
16. Exercise on applets
    i) Programs on Graphics and colors.
    ii) Simple animations using threads and graphics.
17. Exercise on AWT controls
    i) Program to handle mouse events.
    ii) Program to handle keyboard events.
    iii) Programs to illustrate Text Fields and Button control.
    iv) Programs to illustrate Check Box and List control.
    v) Write an application program to illustrate multiple controls.

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

**KEY COMPETENCIES**

| Exp. No. | Name of the experiment | Objectives | Key Competencies |
|---|---|---|---|
| 1 | Exercise programs using Java built-in data types. | (a) Write programs using the primitive data types.<br>(b) Display the data. | (a) Identify the data types.<br>(b) Use println() method.<br>(c) Compile the program.<br>(d) Rectify the errors.<br>(e) Observe the output. |
| 2 | Exercise programs on conditional statements and loop statements. | (a) Write program using if statement and switch<br>(b) Write program using while, do and for constructs. | (a) Know the usage of IF and switch statements.<br>(b) Compile the program and rectify the errors.<br>(c) Observe the output. |
| 3 | Exercise programs on I/O Streams | (a) Write a program to give values to variables interactively through the keyboard.<br>(b) Write program to read and write primitive data types.<br>(c) Write programs to handle Files. | (a) Use different data types.<br>(b) Use readLine() method.<br>(c) Use println() method.<br>(d) Use DataInputStreamand DataOutputStream.<br>(e)use File Streams<br>Observe the output. |
| 4 | Exercise programs on Strings. | (a) Write a programs to manipulate Strings<br>(b) Write a programs to arrange array of strings in ascending order | (a) Create String objects<br>(b) Use string class methods<br>(c) Observe the output. |
| 5 | Exercise program to create class and objects and adding methods. | (a) Write a program to create a class and create objects.<br>(b) Write a program to create class adding methods and access class members. | (a) Create class.<br>(b) Declare methods.<br>(c) Create objects.<br>(d) Write main method.<br>(e) Access class members. |
| 6 | Exercise programs using constructors and construction over loading. | (a) Write a program using default constructor.<br>(b) Write a program using parameterized constructor. | (a) Declare and define constructor.<br>(b) Call default constructor.<br>(c) Call parameterized constructor.<br>(d) observe constructor overloading. |
| 7 | Exercise programs on command line arguments. | (a)Write a program to illustrate usage of command line arguments. | (a) Use command line arguments.<br>(b) Run the program.<br>(c) Understand usage of Files.<br>(c) Observe the output. |

| | | | |
|---|---|---|---|
| | | (b)Write a program to read data as command line arguments and update it into Files. | |
| 8 | Exercise programs using concept of overloading methods. | (a) Write a program to illustrate method overloading.<br>(b) Write a program to illustrate method overloading using constructors. | (a) Observe method overloading.<br>(b) Overload constructor methods. |
| 9 | Exercise on inheritance. | (a)Write a program to illustrate single inheritance.<br>(b)Write a program to illustrate multiple inheritance. | (a) Create base class.<br>(b) Write base class constructor.<br>(c) Create derived class.<br>(d) Use extends keyword.<br>(e) Use super keyword.<br>(f) Write derived class constructor. |
| 10 | Write a program using the concept of method overriding. | Write a program using the concept of method overriding. | (a) Use method overriding.<br>(b) Use this keyword.<br>(c) use super keyword |
| 11 | Exercise on importing packages. | Write a program to create and importing package. | (a) Create package.<br>(b) Use of access specifiers.<br>(b) Use package.<br>(c) Use import keyword. |
| 12 | Exercise on interfaces. | Write a program to illustrate multiple inheritance using interfaces. | (a) Define interface.<br>(b) Use extends keyword.<br>(c) Use implements keyword.<br>(d) Access interface variables. |
| 13 | Exercise programs on Collections. | (a) Write a java program to search a student mark percentage based on pin number using Array list.<br>(b)Write a java program to create linked list to perform delete, insert, and update data in linked list with any application.<br>(c)Write a java program to search an element from hash table.<br>(d)Write a java program to sorting employee details using hash map. | (a) Define collection classes<br>(b) use ArrayList, LinkedList<br>(c) use Hash Map, Hash Table<br>(d) apply List and Iterator Interface<br>(e) use Enum Set, and Enum Map |
| 14 | Exercise on exception handling | (a) Write a program to illustrate exception handling.<br>(b) Write a program to | (a) Use try – catch.<br>(b) Use multiple catch blocks.<br>(c) Use finally statement.<br>(d) use Nested try |

| | | | |
|---|---|---|---|
| | | illustrate exception handling using multiple catch statements.<br>(c) Write a program to illustrate exception handling using nested try. | |
| 15 | Exercise on multithreading | (a) Write a program to create single a thread by extending the thread class.<br>(b) Write a program to create a single thread by implementing the runnable interface.<br>(c) Write a program to create multiple threads.<br>(d) Write a program to illustrate thread priorities.<br>(e) Write a program to illustrate inter thread communication. | (a) Use extends, new.<br>(b) Use run() and start() methods.<br>(c) Observe thread execution.<br>(d) Use implements runnable interface.<br>(e) Use setPriority() and getPriority() methods.<br>(f) use wait(),notify() methods |
| 16 | Exercise on applets. | Write a program to create simple applet to display different shapes with colors.<br>Write an applet program to design simple animation. | (a) Use <applet>…</applet> tag.<br>(b) Add applet to html file.<br>(c) Run the applet.<br>(d) use graphics methods<br>(e) use threads and graphics. |
| 17 | Exercise on AWT controls | (a) Write an applet program to handle key events.<br>(b) Write an applet program to handle mouse events.<br>(c) Write an applet program to illustrate Text Field and button control.<br>(d) Write an applet program to illustrate Check box and List control.<br>(e) Write an applet program to illustrate multiple controls. | (a) Use keyboard event methods<br>(b) Use mouse event methods<br>(c) Use Text Field class methods<br>(d) Use button class methods<br>(e) Use Check box and List class methods |

**PYTHON PROGRAMMING LAB**

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-507 | Python Programming Lab | 4 | 60 | 40 | 60 |

| | | | |
|---|---|---|---|
| **Course Outcomes** | At the end of the course the student will be able to: | | |
| | CO 1 | CM-507.1 | Execute Simple python programs |
| | CO 2 | CM-507.2 | Execute Python programs using expressions, operators |
| | CO 3 | CM-507.3 | Execute python programming using Functions, packages |
| | CO 4 | CM-507.4 | Demonstrate Python programs using Lists |
| | CO 5 | CM-507.5 | Develop Python programs using OOP Concepts and exceptions |
| | CO 6 | CM-507.6 | 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.

**TIME SCHEDULE**

| Sl. No. | Major Topic | Periods | CO’S mapped |
|---|---|---|---|
| 1. | Write and execute simple python Program. | 3(2,1) | CO1,CO6 |
| 2. | Write /execute simple ‘Python’ program: Develop minimum 2 programs using different data types (numbers, string, tuple, list, dictionary). | 4(2,1,1) | CO1,CO2,CO6 |
| 3. | Write /execute simple ‘Python’ program: Develop minimum 2 programs using Arithmetic Operators, exhibiting data type conversion. | 4(2,1,1) | CO1,CO2,CO6 |
| 4. | (i)Write simple programs to convert U.S. dollars to Indian rupees.<br>(ii) Write simple programs to convert bits to Megabytes, Gigabytes and Terabytes. | 3(1,1,1) | CO1,CO2,CO6 |
| 5. | Write simple programs to calculate the area and perimeter of the square, and the volume & perimeter of the cone. | 3(1,1,1) | CO1,CO2,CO6 |
| 6. | Write program to: (i) Determine whether a given number is odd or even. (ii) Find the greatest of the three numbers using conditional operators. | 3(1,1,1) | CO1,CO2,CO6 |
| 7. | Write a program to: i) Find factorial of a given number. ii) Generate multiplication table up to 10 for numbers 1 to 5. | 2(1,1) | CO1,CO2,CO6 |

| | | | |
|---|---|---|---|
| 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. | 2(1,1) | CO1,CO2,CO3 |
| 9. | Write a program to: i) Find factorial of a given number using recursion. ii) Generate Fibonacci sequence up to 100 using recursion. | 2(1,1) | CO1,CO2,CO3 |
| 10. | Write a program to: To print Factors of a given Number. | 2(1,1) | CO4,CO6 |
| 11. | Write a program to: Create a list, add element to list, delete element from the lists. | 3(1,1,1) | CO1,CO3,CO6 |
| 12. | Write a program to: Sort the list, reverse the list and counting elements in a list. | 3(1,1,1) | CO2,CO3,CO6 |
| 13. | Write a program to: Create dictionary, add element to dictionary, delete element from the dictionary. | 3(1,1,1) | CO2,CO3,CO6 |
| 14. | Write a program to: To calculate average, mean, median, and standard deviation of numbers in a list. | 3(1,1,1) | CO2,CO3,CO6 |
| 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. | 4(2,2) | CO1,CO6 |
| 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’. | 4(2,2) | CO1,CO6 |
| 17. | Write a Program to: Add two complex number using classes and objects. | 4(2,2) | CO5,CO6 |
| 18. | Write a Program to: Subtract two complex number using classes and objects | 3(2,1) | CO5,CO6 |
| 19. | Write a Program to: Create a package and accessing a package. | 2(1,1) | CO5,CO6 |
| **Total** | | **60** | |

**KEY COMPETENCIES**

| Sl.No | Name of the Experiment | Objectives | Key Competencies |
|---|---|---|---|
| 1. | Write and execute simple python Program. | Write a simple python program to print Hello World! and debug and execute | 1. Know the usage of Python IDLE<br>2. Edit and save the program<br>3. Check for the syntax errors and clear the errors<br>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<br>2. Write basic python program using datatypes<br>3. Evaluate arithmetic expression<br>4. Run the program<br>5. Rectify the syntactical errors<br>6. Execute the program<br>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<br>2. Build arithmetic expressions<br>3. Identify the priorities of operators<br>4. Evaluate arithmetic expression<br>5. Run the program<br>6. Rectify the syntactical errors<br>7. Execute the program<br>Check the output for its correctness |

| | | | |
|---|---|---|---|
| 4. | (i)Write simple programs to convert U.S. dollars to Indian rupees.<br>(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<br>2. Build arithmetic expressions<br>3. Identify the priorities of operators<br>4. Evaluate arithmetic expression<br>5. Run the program<br>6. Rectify the syntactical errors<br>7. Execute the program<br>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<br>2. Build arithmetic expressions<br>3. Identify the priorities of operators<br>4. Evaluate arithmetic expression<br>5. Run the program<br>6. Rectify the syntactical errors<br>7. Execute the program<br>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<br>2. Use the if statement for decision making<br>3. Rectify the syntax errors<br>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<br>2. Use while statement with correct syntax<br>3. Check whether correct number of iterations are performed by the while loop<br>4. Rectify the syntax errors<br>5. Debug logical errors |

| | | | |
|---|---|---|---|
| 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. | Write a Python program to make use of function. | 1. Build the application using functions<br>2. Use while statement with correct syntax<br>3. Check whether correct number of iterations are performed by the while loop<br>4. Rectify the syntax errors<br>5. 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.<br>2. Build the terminating condition for recursion.<br>3. Rectify the syntax errors<br>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<br>5. Use while statement with correct syntax<br>6. Check whether correct number of iterations are performed by the while loop<br>7. Rectify the syntax errors<br>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<br>2. Create a list<br>3. Read elements from list<br>4. Add elements to list<br>5. Delete elements<br>6. Rectify the syntax errors<br>7. Debug logical errors<br>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<br>2. Create a list<br>3. Read elements from list<br>4. Add elements to list<br>5. Delete elements<br>6. Rectify the syntax errors<br>7. Debug logical errors<br>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<br>2. Create a dictionary<br>3. Read elements from list<br>4. Add elements to dictionary<br>5. Delete elements from dictionary<br>6. Rectify the syntax errors<br>7. Debug logical errors<br>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<br>2. add elements to list<br>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<br>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<br>2. Add contents to the file<br>3. Open a Python file in Read mode<br>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<br>2. Create an object in Python<br>3. Debug the python program<br>4. 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<br>2. Create an object in Python<br>3. Debug the python program<br>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<br>2. Access the package in Python<br>3. Debug the python program<br>Check the correctness |

## Life Skills

| Course Code | Course Title | No. of Periods/Week | Total No. of Periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| Common 508 | Life Skills | 3 | 45 | 40 | 60 |

| CO No. | Course Outcomes |
|---|---|
| CO1 | Demonstrates positive attitude and be able to adapt to people and events |
| CO2 | Fixes personal and professional goals and manages time to meet targets |
| CO3 | Exhibits critical and lateral thinking skills for problem solving. |
| CO4 | Shows aptitude for working in teams in a stress free manner and sometimes/ very often/ mostly display leadership traits. |

| S. No. | Unit Title | No of Periods | COs Mapped |
|---|---|---|---|
| 1 | **Attitude** | **4** | CO1 |
| 2 | **Adaptability** | **4** | CO1, CO2 |
| 3 | **Goal Setting** | **4** | CO1, CO2, CO3 |
| 4 | **Motivation** | **4** | CO1, CO2, CO3 |
| 5 | **Time Management** | **4** | CO2 |
| 6 | **Critical thinking** | **4** | CO3 |
| 7 | **Creativity** | **4** | CO3 |
| 8 | **Problem Solving** | **5** | CO3 |
| 9 | **Team Work** | **4** | CO4 |
| 10 | **Leadership** | **4** | CO4 |
| 11 | **Stress Management** | **4** | CO4 |
| **Total Periods** | | **45** | |

**Blue Print for evaluation based on Course Outcomes for SA:**

Note: Every Activity based Question that focuses on COs and responses as exhibited through communication has to be given marks for the following parameters

- Clarity of Thinking as Exhibited through Content
- Features of Etiquette

***Rubric Descriptors 'Outstanding/ Very Good/ Good/ Satisfactory/ Poor' levels of Competence**

| Level of Competence | Parameters of Assessment | |
|---|---|---|
| | **Clarity of thinking as exhibited through content** | **Features of etiquette** |
| **Outstanding 10** | **Thinking** is **extremely logical** and suggested course of action is **feasibile**<br>Shows **creativity and uniqueness**<br>Exhibits **expert use of expression** (organizational devices and discourse markers) that denote clarity in thought. | Exhibits **courtesy to all most appropriately** with **confidence** |
| **Very Good 8/9** | **Thinking** is **clear and logical**<br>Suggested **course of action is feasible**<br>Shows **traces of creativity**<br>Exhibits **good expression** (organizational devices and discourse markers) that denote clarity in thought. | Exhibits **courtesy to all to a considerable level.** |
| **Good 6/7** | **Thinking is clear and logical most of the time**. Lacks creativity or out of the box thinking as expressed through content. | Exhibits **courtesy / politeness to an acceptable level.** |
| **Satisfactory 4/5** | **Thinking is logical**; However **expressing content is disjointed and disorganized.** | Has courtesy but often fumbles with language. |
| **Poor 3 or less than 3** | **Thoughts** as expressed through content are **incoherent. Language skills are very limited.** | Fails to show courtesy to others. |

**Blue Print for evaluation based on Course Outcomes for SA of each student:**
**Note: Marks are awarded for each student as per the Rubric descriptors.**

| S No | Questions based on Course Outcomes | Periods Allocated for practical work | Max Marks | Poor >3 | Satisfactory 4 /5 | Good 6/7 | Very Good 8/9 | Outstanding 10 |
|---|---|---|---|---|---|---|---|---|
| 1 | Short presentation on GOALS with Timeline and Action Plan | 12 | 10 | | | | | |
| 2 | State what you will do in the given situation (Assesses adaptability and critical thinking skills, leadership, team skills ) | 12 | 10 | | | | | |
| 3 | In how many different and creative way can you use _____ (Object) other than its primary use | 8 | 10 | | | | | |
| 4 | What solutions can you think of for _____ problem. | 13 | 10 | | | | | |
| | Total | 45 | 60 | | | | | |

**Note: The marks that are awarded for the student for 40 to be increased proportionally for 60.**

**Learning Outcomes**

1. **Attitude Matters :**
   - 9.1 Understand the importance of positive attitude and the consequences of negative attitude.
   - 1.2 Demonstrate positive attitude in dealing with work-related issues and in personal life.
2. **Adaptability….*makes life easy :***
   - 10.1 Understand the significance of adaptability.
   - 2.2 Show adaptability whenever needed, both at place of work and on personal front.
3. **Goal Setting … *life without a Goal is a rudderless boat!***
   - 3.2 Understand the SMART features of goal-setting.

**3.3** State one's short-term and long-term goals and spell out plans to achieve them.

***4.*** **Motivation … *triggers success!***

4.2 Comprehend the need for motivation in order to achieve success in life.

4.3 State how one is motivated in life.

4.4 Show the impact of motivation on one's life

***5.*** **Time Management… *the need of the Hour!***

5.2 Understand the value of time management and prioritizing in life

5.3 Demonstrate the effect of time management on one's professional work.

***6.*** **Critical Thinking … *logic is the key!***

6.1 Distinguish between facts and assumptions

6.2 Use logical thinking in dealing with professional matters

***7.*** **Creativity … *the essential you!***

7.2 Understand the importance of thinking out of the box in dealing with critical issues

7.3 Solve problems using creativity / imagination

***8.*** **Problem Solving … *there is always a way out!***

8.2 Understand the need for and importance of problem solving.

8.3 Use logic or creativity to solve a problem at workplace or home.

***9.*** **Team Work… *together we are better!***

9.1 Understand the need for team skills / team building

9.2 Demonstrate one's skills as a team player

***10.*** **Leadership… *the meaning of a leading!***

10.1 Understand the need for team skills / team building

10.2 Demonstrate one's skills as a team player

***11.*** **Stress Management… *live life to the full!***

11.1 Understand what causes stress and how to cope with stress at workplace.

11.2 Demonstrate how stress can be overcome in a healthy way.

## PROJECT WORK

| Course code | Course Title | No. of Periods/Weeks | Total No. of periods | Marks for FA | Marks for SA |
|---|---|---|---|---|---|
| CM-509 | **PROJECT WORK** | 6 | 90 | 40 | 60 |

| | | | |
|---|---|---|---|
| **Course Outcomes** | At the end of course student able to | | |
| | CO1 | CM-509.1 | Identify the hardware, software problems and their feasibility |
| | CO2 | CM-509.2 | Prepare SRS document based on gathered and analysed requirements |
| | CO3 | CM-509.3 | Design the plan document based on SRS |
| | CO4 | CM-509.4 | Code and test the software based on the design document |
| | CO5 | CM-509.5 | Practice software maintenance skills and maintaining quality and reliability |
| | CO6 | CM-509.6 | 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. HARDWARE and NETWORKING PROJECTS
   a. QLAN establishing
   b. Using interfacing devices
   c. Voice synthesizer
   d. Voice recognizer
   e. Printer sharer
   f. ADD ON cards or any relevant

3. SOFTWARE AND HARDWARE PROJECTS
   a. Using interfaces, microcontrollers. Microprocessors and PCs
   b. Inter-cum
   c. Assembling computer along with peripherals.
   d. Traffic light controller
   e. Stepper motor related
   f. Lift controllers
   g. Level controllers
   h. Temperature controllers

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

**DIPLOMA IN COMPUTER ENGINEERING**
**SCHEME OF INSTRUCTIONS AND EXAMINATION**

**CURRICULUM-2020**

**(VI Semester)**

**CM-601 Industrial Training**

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

| S No | Unit Title | Duration | COs Mapped |
|---|---|---|---|
| 1 | Application of Knowledge acquired. | 1 month | CO1 |
| 2 | Skill Acquirement. | 2 months | CO2 |
| 3 | Participate in product development. | 2 months | CO3 |
| 4 | Preform onsite service. | 1 month | CO4 |
| | Total | 6 months | |

| | | | |
|---|---|---|---|
| **Course Outcomes** | At the end of course student able to: | | |
| | **CO1** | **CM-601.1** | Apply knowledge and skill already learnt in the institution. |
| | **CO2** | **CM-601.2** | Acquire the required skills of analysis, design and development, testing, verification and validation, deployment and distribution of the product. |
| | **CO3** | **CM-601.3** | Involve in product design, development, quality testing and maintenance production by exhibiting the strength, teamwork spirit and self-confidence |
| | **CO4** | **CM-601.4** | Prepare product document, gain the skills in deploying product at customer site, training the end user, maintaining the system. |

**LEARNING OUTCOMES (In-house training):**

| TRAINING MODULE NO. | TOPIC | LEARNING OUTCOMES (In-house training) | No. OF PERIODS |
|---|---|---|---|
| Module1 | **Planning** | 1. Define the problem<br>2. Identify the scope of any existing systems.<br>3. Determine the objectives for the proposed new system.<br>4. Developing an effective outline for the upcoming development cycle.<br>5. Catch problems.<br>6. Identify funding and resources.<br>7. Set the project schedule at various time frames | **90** |
| Module 2 | **Analysis** | 1. Define prototype system requirements<br>2. Evaluate alternatives to existing prototypes<br>3. Perform research and analysis to determine the needs of end-users<br>4. Prepare software requirement specification ( SRS) document.<br>5. Specify the software, hardware, and network requirements. | **110** |
| Module 3 | **Design** | 1. Design overall system architecture.<br>2. User interfaces<br>3. System interfaces<br>4. Network requirements<br>5. Databases<br>6. Prepare design document. | **110** |
| Module 4 | Development | 1. Practice coding guidelines.<br>2. Code and build the application as per the design using modular programming.<br>**3.** Compilation and execution. | **200** |
| Model 5 | Testing | 1. Perform debugging.<br>2. Perform Modular and integrated testing.<br>3. Verify and validate the system.<br>4. Prepare the testing document and/or user document. | **60** |
| Module 6 | Product installation and maintenance | **1.** Site preparation for deploying product<br>**2.** Install a product system at site.<br>**3.** Train the end user to operate the system.<br>**4.** Provide security enforcement.<br>**5.** Provide maintenance to the system after installation.<br>**6.** Explain customer relationship importance | **60** |
| **TOTAL NUMBER OF PERIODS** | | | **630** |

**LEARNING OUTCOMES (In Industry): The student shall be able to display the following skill sets**

1. Apply knowledge and skill already learnt in the institution.
2. Acquire the required skills of analysis, design and development, testing, verification and validation.
3. Acquire skills of deployment and distribution of the product.
4. Involve in product design, development, quality testing and maintenance production by exhibiting the strength, teamwork spirit and self-confidence
5. Prepare product documents like user manual and installation guide and operational manuals.
6. Perform the activities of deploying product at customer site and training the end user.
7. Maintaining the system at user site (Post product services)

**Scheme of evaluation**

<table>
<tr><th rowspan="2">Sl.No.</th><th rowspan="2">Subject</th><th rowspan="2">Duration</th><th colspan="3">Scheme of evaluation</th></tr>
<tr><th>Item</th><th>Nature</th><th>Max. Marks</th></tr>
<tr><td rowspan="5">1</td><td rowspan="5">Industrial Training</td><td rowspan="5">6 months</td><td>1.First Assessment at Industry (After 12 Weeks)</td><td>Assessment of learning outcomes by both the faculty and training mentor of the industry</td><td>120</td></tr>
<tr><td>2.Second Assessment at the Industry (After 22 weeks))</td><td>Assessment of learning outcomes by both the faculty and training mentor of the industry</td><td>120</td></tr>
<tr><td rowspan="3">Final Summative assessment at institution level</td><td>Training Report</td><td>20</td></tr>
<tr><td>Demonstration of any one of the skills listed in learning outcomes</td><td>30</td></tr>
<tr><td>Viva Voce</td><td>10</td></tr>
<tr><td colspan="5">TOTAL MARKS</td><td>300</td></tr>
</table>

**Weightage of marks for Assessment of Learning Outcomes during first and second assessment**

| Sl.No | Learning Outcome | Max Marks Allotted For first assessment | Max Marks Allotted For second assessment |
|---|---|---|---|
| 1 | Apply knowledge and skill already learnt in the institution. | 50 | 10 |
| 2 | Acquire the required skills of analysis, design and development , testing, verification and validation. | 40 | 20 |
| 3 | Acquire the required skills of deployment and distribution of the product. | 30 | 10 |
| 4 | Involve in product design, development, quality testing and maintenance production by exhibiting the strength, teamwork spirit and self-confidence | - | 25 |
| 5 | Prepare product documents like user manual and installation guide and 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 |
| | Total | 120 | 120 |

During assessment the performance of the students shall be assessed in those skills in which the student has been trained and be awarded the marks as per the weightage assigned as above. In case the student has undergone training in a few skill sets then the total marks obtained shall be raised to 120 marks for the given assessment i.e. either assessment 1 or 2. However the performance of the student shall be assessed at the most skill sets listed above but not less than three skill sets.

**Illustration for First assessment.**

If the student has undergone training in only in 2 skill sets ( namely 1 → for 50 marks, and 2→ for 40 marks ) out of 3 ( namely 1 → for 50 marks, 2→ for 40 marks and 3 → for 30 marks) in First assessment and marks awarded during

assessment is 60 out of 90 marks, then the marks of 60 shall be enhanced to 120 proportionately as (60/90)*120=80.

**Illustration for second assessment .**

If the student has undergone training in only in 5 skill sets ( namely 1 → for 10 marks, 2→ for 20 marks , 3 - for 10 marks, 4→ for 25 marks, 5→ For 15 marks ) out of 7 ( namely 1 → for 10 marks, 2→ for 20 marks , 3 → For 10 marks, 4→ for 25 marks, 5→ For 15 marks, 6 → for 25 marks and 7→ for 15 marks ) in Second assessment and marks awarded during assessment is 65 out of 80 marks, then the marks of 65 shall be enhanced to 120 proportionately as (65/80)*120=97.5 = rounded to 98.

**GUIDELINES FOR INDUSTRIAL TRAINING OF DIPLOMA IN COMPUTER ENGINEERING PROGRAMME**

1. Duration of the training: 6 months.
2. Eligibility: The As per SBTET norms
3. Training Area: Students can be trained in either in In-house/Industry in the areas of Application Software Development / system software Development / firmware development / Mobile application development/ Database applications / Web development/ IoT application development / smart technologies / Hardware interfacing/ Networking .
4. The candidate shall put a minimum of 90% attendance during Industrial Training.
5. If the student fails to secure 90% attendance during industrial training, the student shall reappear for 6 months industrial training.
6. 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.
7. 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.
8. 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.
9. Final summative assessment at institution level is done by a committee including1. Head of the section ( of concerned discipline ONLY), 2.External examiner from an industry and 3. Faculty member who assessed the student during Industrial Training as members.

**Guidelines and responsibilities of the faculty members who are assessing the students performance during industrial training:**

1. Shall guide the students in all aspects regarding training.
2. Shall create awareness regarding safety measures to be followed in the industry during the training period, and shall check it scrupulously.
3. Shall check the logbook of the students during the time of their visit for the assessment.

4. Shall monitor progress at regular intervals and make appropriate suggestions for improvement.
5. Shall visit the industry and make first and second assessments as per stipulated schedules.
6. Shall assess the skill sets acquired by the students during their assessment.
7. Shall award the marks for each skill set as per the marks allotted for that skill set during 1st and 2nd assessments
8. Shall voluntarily supplement students learning through appropriate materials like photographs, articles, videos etc.
9. Shall act as co-examiner along with other examiners in the final assessment at institution.
10. Shall act as liaison between the student and mentor.
11. Shall maintain a diary indicating his observation with respect to the progress of students learning in all three domains (Cognitive, Psychomotor and Affective).

**Guidelines to the training mentor in the industry:**

1. Shall train the students in all the skill sets as far as possible.
2. Shall assess and award the marks in both the assessments along with the faculty member.
3. Shall check and approve the log books of the students.
4. Shall approve the attendance of each student at the end of the training period.
5. Shall report to the guide about student's progress, personality development or any misbehavior as the case may be.

**DEPARTMENT OF TECHNICAL EDUCATION**
**NAME OF THE INSTITUTION**
**INDUSTRIAL TRAINING FIRST ASSESSMENT**

**PIN:**

**NAME OF THE STUDENT:**

**Name of the Industry:**

| ***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) Signature of the visiting staff (Guide)

Name: Name:

Designation: 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) Signature of the visiting staff (Guide)

Name: Name:

Designation: Designation: