



**GOVERNMENT OF KERALA
DEPARTMENT OF TECHNICAL EDUCATION**

**CURRICULUM DEVELOPMENT CENTRE
KALAMASSERY**

**CURRICULUM OF
DIPLOMA COURSE**

IN

**COMPUTER HARDWARE
MAINTENANCE**

**SEMESTER SYSTEM
(Revision 2006)**

**Prepared at
CURRICULUM DEVELOPMENT CENTRE, KALAMASSERY**

RULES AND REGULATIONS OF THE DIPLOMA COURSES
IN ENGINEERING/TECHNOLOGY/COMMERCIAL PRACTICE
UNDER THE STATE BOARD OF TECHNICAL EDUCATION,
KERALA STATE. (SEMESTER SYSTEM)

01. Duration of the Diploma Course

The duration of the regular Diploma courses will be of three academic years, consisting of Six (6) consecutive semesters. The first 2 Semesters are combined and run on an year pattern, and called “Combined First and Second Semesters”.

02. Medium of Instruction

The medium of instruction in all the theory and practical subjects shall be English.

03. Eligibility for Selection to the Diploma Course

Candidates for admission shall be required to have passed Xth class examination (S.S.L.C.) conducted by the Board of Public Examinations, Kerala State or any other equivalent examinations already recognized by the Board of Public Examinations, of Kerala State, with the eligibility for Higher Education.

04. Instructional duration in an academic year

- a) The academic year shall consist of 2 Semesters, each consisting of a minimum of 16 weeks of instruction, including intervening holidays, but excluding the period of examinations and study holidays.
- b) The course will follow Semester pattern, with an End semester examinations, conducted by the Board of Technical Examinations, Kerala State. The examinations for first year (Semester I & II Combined) will be conducted at the end of second semester.
- c) There will be 7 Instructional periods of 55 Minutes duration per Day, and there shall be 5 working days in a week from Monday to Friday, and thereby 35 Periods per Week.

05. Minimum attendance required for obtaining eligibility to appear for the Examination.

- a) A candidate must secure a minimum of 80% attendance in the combined First and Second Semester and in each subsequent Semester, in order to secure the eligibility to appear for each End Semester examinations.
- b) In the case of those students with 65% or more attendance but could not attain 80% attendance due to Medical reasons, the Principal of the Polytechnic, at his/her discretion, may grant the eligibility to appear for the examination, subject to the remittance of “Condonation fee”, fixed by the Government from time to time.
- c) Students who have secured less than 65% attendance are not eligible to apply for “condonation”, and will not be allowed to appear for the examination under any circumstances.
- d) Students who have shortage of attendance, but not condoned, in any of the semesters including first year, are not eligible to appear for the end Semester Examinations, and therefore not

eligible to be promoted to the higher semesters. They may seek readmission. Application for readmission may be entertained only for genuine cases on medical grounds and in doubtful cases the Principal may seek report from medical board for verification.

- e) Condonation of attendance is permitted only once in the entire course of study both in the case of regular and part time courses.

06. Scheme of Evaluation.

- a) The scheme of evaluation shall consist of (1) Internal assessment (Sessional) and (2) End Semester examinations in Theory and Practical Subjects. The maximum marks for End Semester Examinations, and Internal Assessment, both for the Theory and Practical papers will be 75 and 25 respectively except for the Combined I & II Semesters. However, for some exceptional subjects, this may vary. Details of break up of marks are given in the Curricula of each discipline.
- b) The Total marks (Internal and End Semester Examinations) will be as follows:
- Combined I &II Semesters: 1000 Marks
- III to VI Semesters: 700 Marks/ Semester
- c) All the end examination including the drawing examination will normally be of 180 Minutes duration. In certain specialized disciplines this requirement may not be adhered to strictly and the End Semester Examination of a longer duration may be permitted.

07. Award of internal assessment marks.

- a) In respect of theory subjects the award of sessional mark will be on a Continuous Evaluation method, based on tests, assignments and attendance in the proportion of 40% for tests, 40% for assignments and 20% for attendance. There will be a minimum of three tests and Three Assignments, and all the 3 Test papers and 3 Assignments are taken into account for the calculation of Final Internal Assessment Marks.
- b) Split up of Internal Assessment Marks :

A. Attendance:

Sl.No.	Percentage of Attendance*	Marks to be awarded (computed for 5 Marks)
1	Below 65	Zero
2	65 to 79	1
3	80 to 84	2
4	85 to 89	3
5	90 to 94	4
6	95 and above	5

B. Practical:

Sl.No.	Criteria component	Marks to be awarded
1	Observation Note/ Rough Record	20%
2	Fair Record (Timely submission, Accuracy and Neatness)	20%
3	Attendance*	20%
4	Test	40%

C. Drawing

Sl.No.	Criteria component	Marks to be awarded
1	Submission of Completed Drawing Sheets (Timely submission, Accuracy and Neatness)	40%
2	Attendance*	20%
3	Test	40%

*Percentage of attendance for that particular subject only is counted here.

D. Seminar

Sl. No.	Criteria component	Marks to be awarded
1	Relevance of Topic	10%
2	Collection of materials	20%
3	Presentation (Presentation slides, Delivery)	40%
4	Question-Answer,/Discussion	20%
5	Seminar Report	10%

E. Project Work

Sl. No.	Criteria component	Marks to be awarded
1	Relevance of Topic & Selection of	10%
2	Knowledge in the Tool	20%
3	Selection of Tool	20%
4	Fabrication & Final product	20%
4	Role of the individual in the Team	20%
5	Project Report	10%

- c) The Faculty concerned will maintain a record of all details regarding Attendance and Internal Assessment marks awarded in the prescribed log book. The students can represent their grievances, if any, in respect of marks awarded, to the concerned Head of Section for clarification.
- d) The students are required to keep a record of all their laboratory exercises performed by them in the form of a laboratory record. This record has to be authenticated by the teacher-in-charge of the laboratory and certified as the record of the bonafide work done by the student by the Head of Section before he is allowed to take the practical examinations. No student will be permitted to take any practical examinations without the bonafide Record.

08. End Examination

- a) In each theory subject and in the drawing subject there will be an end examination in each Semester conducted by the Board of Technical Examination, Kerala State as per the pre-announced notification of examinations. The Timetable for the examination will also be informed to the students ahead of their conduct.
- b) Regular/Supplementary examination for all semesters will be held at the end of each semester as the case may be.
- c) The question paper for each Theory paper (excluding the Drawing papers) will consist of Two parts:
Part A – is for a maximum of 15 marks consisting of 10 short answer type questions of 1 ½ (One and a half) marks each (to be answered in one or two sentences) covering the whole subjects area. There will be no choice in Part A.
Part B – consists of 10 structured essay type questions of 12 marks each with two question from each of the five units in a subject. Students will have to attempt one question from each unit to score the prescribed maximum of 60 marks.
The part A and Part B will be given together in one question paper.
- d) For drawing subjects, the design of question paper will be according to the needs of that particular drawing. There will not be any short answer type question in drawing.
- e) For practical end examinations, the Board of Technical Examination, Kerala State will appoint examiners who will set a question paper consisting of practical exercises. This will be used for that practical subject.

09. Minimum marks for a pass

- a) A candidate must secure a minimum of 40% marks in the End Semester examination in Theory and Practical for a Pass in each subject. There will be no separate minimum for a pass in the internal assessment but the total marks of End Semester examination and Internal assessment should not be less than 40% for a pass each subject.

10. Rules for promotion to the Higher Semesters.

- a) A candidate will be allowed to go to the next higher Semester, if he/she attended the Combined I & II Semester/ Previous Semester, and has fulfilled the conditions of attendance requirement. However,
- b) A candidate will be permitted to register for the Fifth Semester Examination if and only if he/she has passed all the subjects of the Combined I & II Semester, and
- c) A candidate will be permitted to register for the Sixth Semester Examination only if he/she has passed all the subjects of Combined I & II, and III Semesters.

11. Classification of successful candidates

- a) Candidates shall be declared to have passed the diploma course only if he/she has secured a Pass in all the theory and practical subjects in all the Six Semesters of study.
- b) There will be 3 classifications of passed candidates namely.
 - First class with distinction
 - First class and
 - Second class
- c) The total marks of the Semesters from 3 to 6 shall be considered to classify the successful candidates. That is all these marks will be added and the percentage of marks out of 2800 worked out.

First Class with Distinction

A candidate will be declared to have passed the Diploma Course in First Class with Distinction if he/she secures not less than 75% of the aggregate marks in all Semesters put together except First Year (Combined I & II Semesters) and passes all the above semesters including the Combined I & II Semesters in the first appearance itself, within the stipulated period of normal study, i.e., Three Years of Six Consecutive Semesters, without any break.

First Class

A candidate will be declared to have passed the Diploma Course in First Class if he/she secures not less than 60% of the aggregate marks in all Semesters put together except First Year (Combined I & II Semesters) and passes all the above semesters including the Combined I & II Semesters, within three consecutive chances including his regular chance offered by the Board of Technical Examination.

Second Class

All other successful candidates will be declared to have passed in the Second Class

12. Provision for Improvement/Betterment:

- a). A candidate, if he desires, may improve his/her marks in any subject, in the immediate chance that follow his regular chance/attempt, in the 3rd, 4th and 5th Semesters. A “regular attempt/chance” is defined as the examination chance of the current semester of his/her study.
- b) A candidate, if he/she desires, will be permitted to better his/her marks of the 6th Semester Subjects by reappearing for the entire subjects of that semester together, by taking the next available chance only. (Betterment can be done only for the 6th Semester)
- c) Improvement/betterment will not be reckoned as another chance/attempt. Candidates appearing for betterment will not be considered for the purpose of ranking.

13. **Award of Rank:** Rank Holder in each Discipline will be selected from among the successful candidates who have passed the Diploma course in “FIRST CLASS WITH DISTINCTION” only. “Grace mark” awarded for the performance in arts/sports/similar extra or co- curricular activities will not be considered for determining the rank holders subject to rules 11 and 12 above.

14. Maximum duration of the Diploma Course:

Normal duration of the diploma course is 6 consecutive Semesters, spanned in 3 Academic Years, as stated in para 01. However, in the case of those who have not acquired Diploma within the stipulated minimum duration of 3 Years, he/she may acquire the Diploma taking a maximum duration of another 3 Years. However, the maximum number of chances to appear for the End Semester examination is limited to 4, including his/her regular chance.

15. Cancellation of Candidature in the Diploma Examination:

If a candidate desires to cancel his candidature for end semester Examination he/she should forward the duly filled in Application Form, recommended by the Principal of the Polytechnics so as to reach the office of the Controller of Technical Examinations within 10 days after the completion of the last theory Examination of that particular Semester examination. For those who have applied for the examination and absent without canceling their candidature, it will be treated as an attempt/ chance. Cancellation of candidature in any Semester Examination is allowed only once. Candidates reported for malpractice will not be eligible for cancellation of examination.

16. Defaulters of fee:

Defaulters of fee will not be permitted to register for the End Semester examination

17. General Information:

Norms for transfer of students:

- a) Application for transfer from one institution to another will be entertained only at the second year (3rd Semester) of the Diploma course. Candidates who desire to get transfer to another institution in the second year (3rd Semester) should submit the application in the prescribed “format for transfer” to the Principal of the Institution to which transfer is requested, through the Principal of the institution where the candidate is studying within 10 days from the date of re-opening of the institution after midsummer vacation.
- b) All applications received within the stipulated time will be processed and the list of candidates selected for transfer on the basis of the index marks secured by the candidates for admission to Polytechnics to the first year (Combined I and II semester) will be published by the concerned principals of the polytechnics to which transfer is requested for, and the selected candidates will be informed accordingly.
- c) Principals of Polytechnics should intimate the names of candidates transferred with branch of study to other institution to the Joint Controller of Technical examinations with details such as name of institutions to which transferred, date of transfer, and Diploma Examinations Register Number within ten days from the last date of admission.

NOTE

The syllabus for the diploma courses in Engineering/Technology are being updated in the semester pattern from the academic year 2006-07. The Government of Kerala in its draft IT policy have stressed the importance of Free & Open Source Software (FOSS). More over the students have completed their schooling using FOSS.

The revision of the Polytechnic Curriculum was in such a way that the use of FOSS can be utilized. It can be observed that in the following subjects the use of FOSS can be promoted,

1. CT 102 / CHM 102/INF102	Software Lab 1
2. CT 306 / CM 306/ IF 306	Software Lab II (C++ & Java) / (C ++)
3. CT 406 / IF 405	Software Lab IV(RDBMS)
4. CT 506 / CM506 / IF 506	Software Lab VII / Software Lab III / Software Lab VIII (Operating Systems)
5. CT 604 /IF 604	Software Lab IX (Web Technology)
6. IF 406	Software Lab V (Java)

The following Software may be downloaded free and used,

a. gcc compiler	C Language
b. g++	C++
c. GNU/Linux	
d. MySQL, Postgress, PHP, Java	

The students will get adequate familiarity with Microsoft's windows environment in the other subjects like,

1. CT 307 /CM 507/IF 307	Software Lab III / Software Lab IV / Software Lab III (VB)
2. CT 507 / IF 605	Software Lab VIII (VC++)
3. IF 507	Software Lab IX (Multi Media)

Hence the students will be in a position to handle both the environments smoothly.

It is requested that in tune with the Govt. IT policy, FOSS be promoted to the maximum extent for practical classes with in the framework of the curriculum and facilities available.

SUBJECTS OF STUDY AND SCHEME OF EVALUATION

**Branch: (i) Computer Engineering
(ii) Computer Hardware Maintenance
(iii) Information Technology**

Semester : Combined I and 2

Code	Subject	Periods Per Week			Evaluation (Marks)			
		Theory	Practical	Total	Theory	Practical	Internal	Total
	THEORY:							
GE101	English	4	----	4	100	----	25	125
GE102	Technical Mathematics	6	----	6	100	----	25	125
GE103	Applied Science							
A	Physics	3	----	3	50	----	12.5	62.5
B	Chemistry	3	----	3	50	----	12.5	62.5
GE104	Engineering Graphics	1	3	4	100	----	50	150
GE 105	Computer Fundamentals & Programming in C	3	----	3	100	----	25	125
CT 101 / CM 101/EL 101/EC 101/IF 101	Basic Electrical & Electronics	4	----	4	100	----	25	125
	PRACTICAL:							
GE106	Applied Science Lab							
A	Physics	----	1	1	----	25	12.5	75
B	Chemistry	----	1	1	----	25	12.5	75
CT102/ CM02/ IF102	Software Lab-I	----	3	3	----	50	25	75
CT103/ CM103 / IF 103	Electron Lab	----	3	3	----	50	25	75
TOTAL		24	11	35	600	150	250	1000

SUBJECT TITLE	:	ENGLISH
SUBJECT CODE	:	GE 101
PERIODS PER WEEK	:	4
PERIODS PER YEAR	:	128
TOTAL MARKS	:	100 (YEARLY EXAMINATION FOR I AND II SEMESTERS)

TIME SCHEDULE

UNIT	TOPICS	PERIODS
I	a) Lessons – From Ignited minds The dream and the message Give us a role model	10 10
II	a) Lessons – From Ignited minds Visionary teachers and scientists	15
III	a) Phonetics and Grammar Introducing speech sounds Consonants, Vowels, Syllables, Stress etc. Tense, Nouns, Verbs, Articles, Active voice and Passive voice Prepositions, Adverbs, Auxiliaries, Direct and Indirect Speech Formation of Questions & Question tags	29
IV	a) Lessons – from Ignited minds Learning from Saints & Seers Patriotism Beyond Politics and Religion To My Country Men Epilogue	15 15 5 5
V	a) Composition Essay writing Comprehension Precise writing Note making Application for Jobs Preparation of bio – data	24
	Total Periods	128

AIM :

The special needs of the technical students in English language require a curriculum that enables them to handle the language as an effective tool for communication. An integration of the four – fold language abilities namely listening, speaking, reading and writing aims at developing the ability to correctly and effectively use the language for specific technical requirements. Thus the teaching of English language to Technical students will definitely help them for their performance in their professional needs.

OBJECTIVES :**1. Comprehension**

- 1.1 Discriminate words and derive ideas in a speech/writing
- 1.2 Express the main ideas in a summary
- 1.3 Organise logically the piece of information provided.
- 1.4 Comprehend written English available in the prescribed text.

2. Vocabulary

- 2.1 Identify the key words
- 2.2 Relate the correct meaning to the terms used
- 2.3 Extend the vocabulary
- 2.4 Use a thesaurus
- 2.5 Study the arrangement of words in sentences
- 2.6 Identify the structural functions of words in sentences.

3. Grammar

- 3.1 Use of tense forms
- 3.2 Nouns, Verbs, Articles
- 3.3 Identify sentence types
- 3.4 Analyse the different types of sentences
- 3.5 Study the ways of negation
- 3.6 Convert direct speech into Indirect speech
- 3.7 Realise active and Passive Voice constructions.

4. Composition

- 4.1 Practice writing essays, précis, note making
- 4.2 Preparation of Application for Jobs and Bio – data

5. Spoken Communication

- 5.1 Distinguish between formal and informal speech situations
- 5.2 Simulate model conversations
- 5.3 Converse within the peer group
- 5.4 Conduct seminars on topics learned in the text.
- 5.5 Conduct model Interviews
- 5.6 Arrange group discussions on General topics

6. Pronunciation

- 6.1 Introduce speech sounds
- 6.2 Consonants, Vowels, Syllables, Stress etc.
- 6.3 Find out pronunciation of words from dictionary
- 6.4 Transcribe words and short passages in broad phonemic script

STUDY MATERIALS

1. Ignited Minds by A.P.J. Abdul Kalam Published by Penguin Books
Chapters : The Dream and the message, Give us a role model, Visionary teachers and scientists. Learning from Saints and seers, Patriotism beyond politics and religion, To my country men, Epilogue.
2. Essential English Grammar by Raymond Murphy Published by Cambridge University Press.
3. Intermediate English Grammar by Raymond Murphy published by Cambridge University Press.
4. Phonetics – A Text Book of English Phonetics for Indian Students by T. Balasubramaniam
Published by Macmillan India (P) Ltd.
5. Composition – A Text Book of Two way Communication Techniques by Prof. P.P. John
Published by Publication Division, University of Calicut.
6. English Pronouncing dictionary by Daniel Jones Published by Cambridge University Press.

SCHEME FOR SETTING QUESTION PAPERS

TOTAL MARKS : 100
DURATION 3 HOURS

I	Short answer questions	7 Numbers	Answer any 5 (5X2)	10 marks
II	Paragraph questions	7 Numbers	Answer any 4 (4X5)	20 marks
III	Essay questions	3 Numbers	Answer any 1 (1X10)	10 marks
IV	Grammar			30 marks
V	Phonetics			10 marks
VI	Composition			20 marks
			Total	<hr/> 100 marks

SUBJECT TITLE : TECHNICAL MATHEMATICS
SUBJECT CODE : GE 102
PERIODS/WEEK : 6
TOTAL PERIODS : 6 x 32 = 192

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	1.1 Matrices	8
	1.2 Determinants	6
	1.3 Binomial Series	6
	1.4 Trigonometric Functions	8
	Tutorials	4
	Test on Topics 1.1 to 1.4	3
II	2.1 Properties of Trigonometric functions	7
	2.2 Properties of triangles	6
	2.3 Solutions of a triangle	7
	2.4 Co-ordinate Geometry	8
	Tutorials	4
	Test on Topics 2.1 to 2.4	3
III	3.1 Functions and Limits	8
	3.2 Methods of Differentiation – I	10
	3.3 Methods of Differentiation – II	10
	Tutorials	4
	Test on Topics 3.1 to 3.3	3
IV	4.1 Application of differentiation	10
	4.2 Maxima and minima	8
	4.3 Indefinite Integral	10
	Tutorials	4
	Test on Topics 4.1 to 4.3	3
V	5.1 Integration by parts	6
	5.2 Definite Integral	6
	5.3 Application of integration	8
	5.4 Differential Equations	8
	Tutorials	4
	Test on Topics 5.1 to 5.4	3
	Revision	10
	Model test and feed back	7
		----- 192

OBJECTIVES

On completion of the units, the student will be able to

UNIT – I

1.1 Matrices

- 1.1.0 Understand operations on matrices such as addition, subtraction, transpose, adjoint, inverse and multiplication
- 1.1.1 Define a matrix
- 1.1.2 Identify the type of a given matrix (Square, Unit, Singular etc)
- 1.1.3 Perform operations of addition and multiplication of a given matrix
- 1.1.4 Define – transpose, adjoint and inverse of a matrix
- 1.1.5 Find the inverse of 2 x 2 and 3 x 3 matrices
- 1.1.6 Solve linear equations by using the inverse of the coefficient matrix

1.2 Determinants

- 1.2.0 Solve simultaneous linear equations using determinants
- 1.2.1 Evaluate determinants of second and third order
- 1.2.3 Find the minors and cofactors of the elements in a determinant
- 1.2.4 Solve simultaneous linear equations in 3 unknowns using Cramer's rule.
- 1.2.5 Elimination of three linear equations in to unknowns.

1.3 Binomial series

- 1.3.0 Understand the binomial theorem for positive integers
- 1.3.1 State the meaning of nC_r
- 1.3.2 Derive formula for nC_r and the proof of $nC_r = nC_{n-r}$
- 1.3.3 State the Binomial theorem for positive integers
- 1.3.4 Find a given term in a binomial expansion

1.4 Trigonometric functions

- 1.4.0 Understand the concept of trigonometric functions of any angle
- 1.4.1 Define trigonometric functions
- 1.4.2 Describe signs of trigonometric functions in each quadrant
- 1.4.3 Find other functions, given a trigonometric function and its quadrant
- 1.4.4 Find the trigonometric values of the angle between 0° and 360° .
- 1.4.5 Find the value of trigonometric functions by using tables.

UNIT – II

2.1 Properties of Trigonometric Functions

- 2.1.0 Apply properties of trigonometric functions of compound angles, multiple and submultiple, sum and product formulae
- 2.1.1 State the identities for $\sin(A \pm B)$, $\cos(A \pm B)$, $\tan(A \pm B)$.
- 2.1.2 Solve the problems of the types
 - (1) Prove that $\frac{\cos A - \sin A}{\cos A + \sin A} = \tan(45^\circ - A)$
- 2.1.3 Prove the formulas for $\sin 2A$, $\cos 2A$, $\tan 2A$, $\sin 3A$ and $\cos 3A$
- 2.1.4 State the identities for $\sin A$, $\cos A$, $\tan A$ in terms of $A/2$.
- 2.1.5 Solve the problems of the type: if $\sin A = 0.6$ and A is acute, find $\sin 2A$ and $\cos A/2$
- 2.1.6 Express sum or difference of two sines or two cosines as a product and vice versa.
- 2.1.7 Apply sum and product formulae to do the problems of the type
 - (1) $\frac{\sin A + \sin 3A + \sin 5A}{\cos A + \cos 3A + \cos 5A} = \tan 3A$
 - (2) $\sin 10^\circ \sin 50^\circ \sin 70^\circ = 1/8$

2.2 Properties of Triangles

2.2.0 Understand the properties of triangles

2.2.1 State and prove the following identities

1)
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$$

2) $a^2 = b^2 + c^2 - 2bc \cos A$

3) $a = b \cos C + c \cos B$

2.2.2 State and prove

1) Napier's formula

$$\tan \left(\frac{B-C}{2} \right) = \frac{b-c}{b+c} \cot (A/2)$$

2) $(b-c) \cos (A/2) = a \sin \left(\frac{B-C}{2} \right)$

2.3 Solution of triangles

2.3.0 Solve a triangle given necessary data

2.3.1 Solve a triangle, given

1) Three sides

2) Two sides and the included angle by using Napier's formula.

2.4 Co-ordinate Geometry

2.4.0 Understand various forms of the equation of a straight line

2.4.1 Define slope of a straight line

2.4.2 Find the slope of a line joining two points (x_1, y_1) and (x_2, y_2)

2.4.3 Derive the equation of a straight line of the form

1) $y = mx + c$

2) $y - y_1 = m(x - x_1)$

3) $\frac{y - y_1}{y_1 - y_2} = \frac{x - x_1}{x_1 - x_2}$

4) $\frac{x}{a} + \frac{y}{b} = 1$

2.4.4 Find the equation of a line given suitable data using any of the above form.

2.4.5 Find the slope and intercepts on the axes, given a linear equation in 'x' and 'y'.

2.4.6 Find the point of intersection of two lines whose equations are given

2.4.7 Find the angle between two lines

2.4.8 Find the condition for two lines are

1) Parallel

2) Perpendicular

2.4.9 Find the equation of the line

1) Parallel and

2) Perpendicular to a given line and passing through a given point.

UNIT – III

3.1 Functions and Limits

3.1.0 Understand the concepts of functions and limits

3.1.1 Give example for functions

3.1.2 Explain the meaning of limit of the following type

1) $\lim_{x \rightarrow a} f(x) = l$

2) $\lim_{x \rightarrow \alpha} 1/x = 0$

3.1.3 Find the limit of the following type

1) $\lim_{x \rightarrow 1} \frac{2x + 1}{3x - 2}$

2) $\lim_{x \rightarrow \alpha} \frac{2x^2 + 3x}{5x^2 + 4x + 1}$

3) $\lim_{x \rightarrow \alpha} \frac{x^2 - 3x}{x^2 - 3x}$

- $x \rightarrow 3 \quad x^2 - 9$
- 3.1.4 verify the following results
- 1) $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = n a^{n-1}$, when n is rational
 - 2) $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$, θ is in radian
- 3.1.5 Solve problems of the type
- 1) $\lim_{x \rightarrow a} \frac{\sqrt{x} - \sqrt{a}}{x - a}$
 - 2) $\lim_{\theta \rightarrow 0} \frac{\sin m\theta}{\theta}$
- 3.1.6 Describe the general definition of continuous functions

3.2 Methods of Differentiation – I

- 3.2.0 Apply the methods of differentiation
- 3.2.1 Define the derivative of a function $y = f(x)$ as $\lim_{\Delta x \rightarrow 0} \frac{\Delta y}{\Delta x}$
- 3.2.2 Show the geometrical concept of derivatives
- 3.2.3 Find the derivatives of x^n , $\sin x$, and $\cos x$ from first principles
- 3.2.4 State the rules of differentiation
- 1) Sum or difference
 - 2) Product
 - 3) Quotient
- 3.2.5 Find derivatives of e^x and $\log n$. State all the fundamental formulae
- 3.2.6 Apply the rules and differentiate simple functions of the type
- 1) $x^2 \sec x$
 - 2) $\frac{\tan x}{x^2 + 1}$
 - 3) $\frac{x \operatorname{Cosec} x}{3x - 2}$

3.3 Methods of Differentiation – II

- 3.3.0 Apply different methods of differentiation
- 3.3.1 Find the derivatives if the functions of the form $[f(x)]^n$, $\sin f(x)$, $\cos f(x)$, with respect to x .
- 3.3.2 Find the derivatives of $e^{\sin x}$, $\log \sin x$, $(x^2+1)^{10}$, $\sec 5x$, $\frac{\sin 2x}{1+\cos 2x}$, $\cot^5(x^3)$, $\log(\sec x + \tan x)$
- 3.3.3 Find the derivative of the implicit functions of the form $ax^2 + 2hxy + by^2 = 0$
- 3.3.4 Differentiate parametric functions of the type $x = f(t)$, $y = g(t)$
- 3.3.5 Find the second derivative of the functions $y = \frac{x}{x-2}$, $y = x^2 \sin x$
- 3.3.6 Solve the problem of the type
If $y = x^2 \cos x$, show that $x^2 \frac{d^2y}{dx^2} - 4x \frac{dy}{dx} + (x^2+6)y = 0$

UNIT – IV

4.1 Applications of Differentiation

- 4.1.0 Apply the theories of differentiation in different problems
- 4.1.1 State geometrical meaning of derivatives
- 4.1.2 Find the slope of the curve
 $y = x^2 - 3x + 2$ at (3,2)
 $y = \tan x$ at $x = \pi/3$
- 4.1.3 Find the equation of the tangent and normal to the semi circle
 $y = \sqrt{25-x^2}$ at (4,3) on it
- 4.1.4 Solve problems of the type: The radius of a circular plate is increasing in length at 0.1 cm per second. What is the rate at which the area is increasing when the radius is 12 cm.
- 4.1.5 Solve problems of the type: A spherical balloon is inflated with air such that its volume increases at the rate 5.c.c per second. Find the rate at which its curved surface is increasing when its radius is 7 cm.
- 4.1.6 Solve problems of the type: The displacement 'S' in time 't' is given by $S = 2/3t^3 + Cost$ at $t = \pi/4$; find the velocity and acceleration

4.2 Maxima and Minima

- 4.2.0 Apply the concept of derivative to find maxima and minima
- 4.2.1 State the conditions for a function
 $y = f(x)$ to be (1) increasing (2) decreasing
- 4.2.2 State the conditions for maximum and minimum values of a function
- 4.2.3 Solve the problem of the type:
 - 1) Find the maximum and minimum values of $y = x^3 - 18x^2 + 96x$
 - 2) Prove that a rectangular of fixed perimeter has its maximum area when it becomes a square.

4.3 Indefinite integral

- 4.3.0 Apply various methods of integration
- 4.3.1 Explain that $\int f(x)dx = f(x) + c$ means $\frac{d}{dx}[f(x)+c] = f(x)$, c being an arbitrary constant
- 4.3.2 State the standard formulas of integral x^n , $\sin x$, $\cos x$, e^x , etc
- 4.3.3 Find the integrals using the rules
 - 1) $\int (u \pm v) dx = \int u dx \pm \int v dx$
 - 2) $\int k u dx = k \int u dx$
- 4.3.4 Evaluate the integrals of the form
 - 1) $\int f(ax+b) dx$
 - 2) $\int \sin^2 x dx$
- 4.3.5 Evaluate the integrals of the form
 - 1) $\int x \sin(x^2) dx$
 - 2) $\int \frac{2x^4}{1+x^{10}} dx$
 - 3) $\int \cos^3 x \sin x dx$
 - 4) $\int e^{x^2} x dx$

UNIT – V

5.1 Integration by parts

5.1.0 Solve the problems of the type

1) $\int x \cos x \, dx$

2) $\int x^2 e^{-x} \, dx$

3) $\int x \log x \, dx$

4) $\int \log x \, dx$

5.2 Definite Integrals

5.2.0 Understand the concept of definite integral

5.2.1 Define the definite integral

$$\int_a^b f(x) \, dx = f(b) - f(a) \text{ where } F'(x) = f(x)$$

5.2.2 Evaluate the definite integral

1) $\int_0^1 x(1-x)^2 \, dx$

2) $\int_0^\pi \sin^2 x \, dx$

3) $\int_0^1 x \sqrt{1+x^2} \, dx$

4) $\int_0^\pi \frac{1-\sin x}{x+\cos x} \, dx$

5) $\int_0^{\pi/2} x \cos x \, dx$

5.3 Application of Integration

5.3.0 Apply the concept of definite integral to solve problems of the following

5.3.1 Find the area bounded by a curve, two ordinates (abscissa) and x – axis (y axis)

5.3.2 Find Volume of a solid of revolution about x or y axis

5.4 Differential equations

5.4.0 Solve simple differential equations of first order

5.4.1 Solve the differential equation of the variable separable type

5.4.2 Solve the differential equation of the form $dy/dx + Py = Q$ where P and Q are simple functions of x

CONTENT DETAILS

UNIT – I

1.1 Matrices

Matrix notation, order of a matrix, and type of matrices: - Square matrix, unit matrix, Zero matrix, and Singular matrix. Transpose of a matrix, symmetric and skew-symmetric matrices, sum and product of matrices, Adjoint of a matrix, inverse of a matrix (definition only) and problems.

1.2 Determinants

Determinants of second and third order matrices, minors and cofactors, Cramer's rule, solution of simultaneous linear equations in three unknowns by Cramer's rule. Elimination of three linear equations in two unknowns.

1.3 Binomial series

Idea of nC_r , Value of nC_r (no derivation). Binomial theorem for positive integers (no proof), finding a given term in a Binomial Expansion.

1.4 Trigonometric functions

Definition of trigonometric functions of an angle in any quadrant, Signs of trigonometric functions of related angles, Given a trigonometric functions of an angle and its quadrant find others. Find the values of the trigonometric functions between 0° and 360° .

UNIT – II

2.1 Properties of trigonometric functions

Addition formulae, Multiple and Sub-multiple formulae, Sum and Product formulae, simple problems.

2.2 Properties of triangles

State and prove Sine rule, Cosine rule and projection formula. State and prove Napier's formula and simple problems relating to this.

2.3 Solution of triangle

Solve the triangle given

1. Three sides
2. Two sides and the included angle (use Napier's formula)

2.4 Co-ordinate geometry

Straight line-Slope, Equations of a straight line in the forms

- 1) $Y = mx + C$,
- 2) $y - y_1 = m(x - x_1)$,
- 3) $\frac{y - y_1}{y_1 - y_2} = \frac{x - x_1}{x_1 - x_2}$
- 4) $\frac{x}{a} + \frac{y}{b} = 1$

Points of Intersection of two lines, Angle between two lines, Conditions for two lines, Conditions for two lines to be parallel and predictor.

UNIT – III

3.1 Function and Limits

Definition, some problems for finding limits, Properties

Limit $\frac{x^n - a^n}{x - a} = na^{n-1}$ and limit $\frac{\sin \phi}{\phi} = 1$ (statements only),
 $x \rightarrow a$ $x - a$ $\phi \rightarrow 0$ ϕ

General definition of continuous functions.

3.2 Methods of Differentiation I

Definition of derivative of x^n , $\sin x$, $\cos x$ etc by using first principle, find derivatives of e^x and $\log x$, Fundamental formulas, product and Quotient rules (statement only). Derivatives of other trigonometric functions, Simple problems.

3.3 Methods of Differentiation II

Function of a function rule, Differentiation of implicit and parametric equations, problems on differentiation of functions involving these forms, second order derivatives, Simple problems.

UNIT – IV

4.1 Application of Differentiation

Geometrical meaning of derivatives, Slope, Tangent, Normal and Equation of a straight line, Rate of change.

Problems connecting Area and Volume, Velocity and Accelerations.

4.2 Maxima and Minima

Increasing and Decreasing functions, Turning points, Finding Maximum and Minimum values of a function by using derivatives, Conditions for Maximum and Minimum, Simple problems.

4.3 Indefinite Integral

Definition of integration, Fundamental formulas, Problems, Integration by substitution, function of the form $\int f(g(x))g'(x) dx$, $\int f(ax + b)^n dx$

UNIT – V

5.1 Integrates by parts

Integral of the product of two functions, formula (without proof) and simple problems.

5.2 Definite Integral

Definitions, simple problems, $\int_0^{\pi/2} \sin^2 x dx$, $\int_0^{\pi/2} \frac{\sin x}{\sqrt{1-\cos x}} dx$

5.3 Application of integration

Finding areas between the curve $y = f(x)$ and the axes, Volume of the solid, Problems

5.4 Differential equations:

Solutions of equations of the form Variable separable, Linear equations.

REFERENCE BOOKS

1. Washington A.J. : Basic Technical Mathematics, Addison Wesley
2. Green John. R : Calculus with Analytic Geometry, McGraw Hill Book Co.,
3. Karuppannan. T.C. : Mathematics for Technical Students, Macmillan and Co.,
4. T.T.T.I. Madras : Mathematics for Technicians Vol. I and II,
Sehgal Educational Consultants (P) Ltd, Faridabad
5. Shanti Narayanan : Algebra

SUBJECT TITLE : APPLIED SCIENCE – A - PHYSICS
SUBJECT CODE : GE 103 A
PERIOD/WEEK : 3
PERIODS/YEAR : 96

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	1.1 Units And Dimensions	5
	1.2 Dynamics	14
	1.3 Work, Power and Energy	5
	1.4 Rotational Dynamics	6
	Test – I	2
II	2.1 Statics	10
	2.2 Elasticity	4
	2.3 Fluid Flow	5
	2.4 Viscosity	3
	2.5 Surface Tension	3
	2.6 Simple Harmonic Motion	5
	Test – 2	2
III	3.1 Optics	7
	3.2 Electricity	12
	3.3 Semiconductors	6
	3.4 Laser	2
	3.5 Photoelectric Effect	3
	Test – 3	2
	Total	96

OBJECTIVES

On Completion of the unit, the student will be able to

UNIT – I

1.1 Units And Dimensions

- 1.1.0 Understand the concept of units and measurements with a basic knowledge about dimensions
- 1.1.1 Define Unit of a physical quantity.
- 1.1.2 Explain the principle of measurement.
- 1.1.3 Identify fundamental and derived units.
- 1.1.4 Define dimension of a physical quantity.
- 1.1.5 Derive dimensional formula for physical quantities.

1.2 Dynamics

- 1.2.0 Apply the dynamics of a particle in practical situations.
- 1.2.1 Identify vector and scalar quantities.
- 1.2.2 Derive the expression $S_n = u + a(n - \frac{1}{2})$
- 1.2.3 Solve Problems related to gravity with equations of motion.
- 1.2.4 Derive the expressions for time of flight, horizontal range and maximum height for a projectile.
- 1.2.5 Solve the problems based on the above expression
- 1.2.6 State the Newton's laws of motion
- 1.2.7 Define the terms:
 - 1. Force
 - 2. Inertia
 - 3. Momentum
- 1.2.8 Derive the relation $F = ma$
- 1.2.9 State Law of conservation of momentum and prove it in the case of two bodies making a collision.
- 1.2.10 Explain the principle behind recoil of gun and derive an expression for recoil velocity.
- 1.2.11 Solve Problems related to Laws of motion.
- 1.2.12 Define angular displacement, angular velocity and angular acceleration.
- 1.2.13 Derive relation between linear velocity and angular velocity.
- 1.2.14 Derive expression for centripetal acceleration.
- 1.2.15 Apply the principle of centripetal force in the case of banking of roads and rails.
- 1.2.16 Solve problems related to centripetal force.

1.3 Work, Power and Energy

- 1.3.0 Understand the concepts of work, power and energy and their applications
- 1.3.1 Define 1. Work 2. Power 3. Energy
- 1.3.2 Distinguish between Potential Energy and Kinetic Energy and mention the expressions for them.
- 1.3.3 Solve problems using the above expressions.

1.4 Rotational Dynamics

- 1.4.0 Understand the dynamics of a rotating body.
- 1.4.1 Define Moment of Inertia of a rigid body
- 1.4.2 Define Radius of gyration
- 1.4.3 State theorems of parallel and perpendicular axes.
- 1.4.4 Define Torque
- 1.4.5 Mention relation between torque and angular momentum.
- 1.4.6 Mention the expression for kinetic energy of rotation.
- 1.4.7 Derive an expression for moment of inertia of a uniform circular disc about an axis passing through its center and perpendicular to its plane.
- 1.4.8 Derive expression for kinetic energy of a disc rotating on a horizontal plane.
- 1.4.9 Solve problems using the above expressions.

UNIT – II

2.1 Statics

2.1.0 Understand the principles of statics and its applications

- 2.1.1 Add Vectors using triangle method.
- 2.1.2 Define Resultant and Equilibrant of vectors.
- 2.1.3 State Parallelogram law of forces.
- 2.1.4 Derive expression for resultant using Parallelogram law.
- 2.1.5 State the law of triangle of forces.
- 2.1.6 State Lami's theorem.
- 2.1.7 Explain moment of a force.
- 2.1.8 State the conditions of equilibrium of a rigid body acted upon by a large number of coplanar parallel forces.
- 2.1.9 Derive expression for work done by a couple.

2.2 Elasticity

- 2.2.0 Comprehend the concept of elasticity
- 2.2.1 Define Stress, Strain and Elastic limit.
- 2.2.2 State Hooke's law.
- 2.2.3 Derive expression for Young's modulus, rigidity modulus and bulk modulus.
- 2.2.4 Solve Problems related to modulus of elasticity.

2.3 Fluid Flow

- 2.3.0 Understand the principle of fluid flow
- 2.3.1 Distinguish between Streamline and Turbulent flow.
- 2.3.2 Explain Pressure energy, Kinetic energy and Potential energy of a liquid.
- 2.3.3 Mention equation of continuity.
- 2.3.4 State Bernouille's theorem.
- 2.3.5 Explain the working of airfoil and atomizer.

2.4 Viscosity

- 2.4.0 Apply the principle of viscosity in solving problems.
- 2.4.1 Define coefficient of viscosity.
- 2.4.2 Give the Poiseuilles formula.
- 2.4.3 Explain terminal velocity.
- 2.4.4 Mention Stoke's formula.
- 2.4.5 Explain the effect of temperature on viscosity
- 2.4.6 Solve problems using Poiseuille's formula.

2.5 Surface Tension

- 2.5.0 Comprehend the phenomenon of surface tension and its applications.
- 2.5.1 Define surface tension.
- 2.5.2 Define surface energy.
- 2.5.3 Derive the relation between surface tension and surface energy.
- 2.5.4 Mention the expression for the excess of pressure issued a spherical drop and bubble.
- 2.5.5 Solve problems related to surface tension.

2.6 Simple Harmonic Motion

- 2.6.0 Comprehend the concept of wave motion
- 2.6.1 Define Simple Harmonic motion.
- 2.6.2 Derive equation for S.H. motion.
- 2.6.3 Explain period, frequency, amplitude and phase.
- 2.6.4 Distinguish between transverse and longitudinal waves.
- 2.6.5 Define wavelength.
- 2.6.6 Derive the relation $V = n\lambda$
- 2.6.7 Explain resonance.
- 2.6.8 Explain ultrasonic frequency.
- 2.6.9 Mention applications of ultrasonic.

UNIT – III

3.1 Optics

- 3.1 Understand the concept of optical phenomena
- 3.1.1 State Snell's law of refraction.
- 3.1.2 Explain critical angle and total internal reflection.
- 3.1.3 Explain the propagation of light through optic fiber.
- 3.1.4 Convex and concave mirror- focus, image formation.
- 3.1.5 Mention the formula $1/u + 1/v = 1/f$ (No derivation)
- 3.1.6 Convex and concave lens - focus, image formation.
- 3.1.7 Mention the formul $1/f = (n-1)(1/R1 - 1/R2)$, No derivation
- 3.1.8 Simple microscope, Magnifying power $m = 1 + D/f$, No derivation.

3.2 Electricity

- 3.2 Understand the fundamentals of electricity and its magnetic effect
- 3.2.1 State Kirchoff's law.
- 3.2.2 Derive expression for balancing condition of wheat Stone's Bridge.
- 3.2.3 State Biots and Savarts law.
- 3.2.4 Mention the expression for magnetic field due to current through a circular cuf.
- 3.2.5 State Fleming's left hand rule.
- 3.2.6 Describe the principle and construction of a moving coil galvanometer.
- 3.2.7 Explain the conversion of galvanometer into ammeter and voltmeter
- 3.2.8 Solves problems based on the above laws.

3.3 Semiconductors

- 3.3 Comprehend the working of semiconductor devices
- 3.3.1 Explain P.N. Junction.
- 3.3.2 Describe a junction transistor PNP and NPN.
- 3.3.3 Explain transistor configuration.
- 3.3.4 Describe a common emitter amplifier.
- 3.3.5 Represent Logic gates symbolically.
- 3.3.6 Explain with the help of truth table.

3.4 Laser

- 3.4 Understand laser action and its application
- 3.4.1 Explain population inversion, spontaneous emission, stimulated emission and optical pumping.
- 3.4.2 Write down the characteristics of LASER.
- 3.4.3 Describe various applications of Laser.

3.5 Photoelectric Effect

- 3.5.0 Comprehend the theories of photoelectric effect
- 3.5.1 Describe Max planks quantum theory.
- 3.5.2 Explain Photoelectric effect and its application.
- 3.5.3 State Laws of Photoelectric emission.
- 3.5.4 Device Einstein's photoelectric equation.
- 3.5.5 Solve problems using the above equation.

CONTENT DETAILS

UNIT – I

1.1 Units and dimensions

Units – fundamental and derived units. Systems of units – S.I. Dimensions – Application – Derivation of expression of period of a simple pendulum using dimension.

1.2 Dynamics

Equation of motion (re-capitulation only) - Derivation of $S_n = U + a(n - \frac{1}{2})$ - Acceleration due to gravity – equation of motion under gravity. Numerical problems.

Projectile motion – Derivation of expressions for Time of flight, Horizontal range, Maximum height Problems.

Linear Momentum, Newton's laws of motion – Definition of force and inertia – Derivation of $F = ma$ – Unit of force. Law of conservation of momentum – Derivation – Recoil of gun. Numerical Problems.

Circular motion – definitions for angular displacement angular velocity and angular acceleration – relation between linear velocity and angular velocity (deviation). Centripetal acceleration and centripetal force-derivation-examples Banking of roads and rails (qualitative) centrifugal force – Numerical problems.

1.3 Work, power and energy

Definitions for Work, Power, Energy – Units of work – Power and energy, Potential energy and Kinetic energy – Expression for P.E and K.E. (no derivation). Numerical problems.

1.4 Rotational Dynamics

Moment of inertia of a rigid body – Radius of gyration. Theorems of Parallel and Perpendicular axis (only statement) – Angular momentum Torque – Relation between Torque and angular momentum (no derivation) expression for K.E. of rotation (no derivation). Moment of Inertia of a uniform circular disc about an axis passing through its center and Perpendicular to its Plane (derivation) – K.E. of disc rolling on a horizontal Plane. Numerical problems.

UNIT – II

2.1 Statics

Vectors and Scalars – Triangle Method of vector addition – Concurrent forces – Resultant and equilibrant – Parallelogram law – Derivation of the resultant in Magnitude and direction – Law of triangle of forces – Lami’s theorem – Resolution of forces – Parallel forces – Like and unlike Parallel forces – moment of force- Conditions of equilibrium of body under the action of a number of coplanar parallel forces couples – Moment of a couple – work done by a couple – Numerical problems.

2.2 Elasticity

Elastic and plastic bodies – Stress – Strain – units - Hooke’s law – Young’s Modulus Rigidity modulus, Bulk modulus – Numerical problems.

2.3 Fluid flow

Stream line and turbulent flow – Pressure energy, Potential energy and kinetic energy of a liquid – Equation of continuity – Bernoulli’s theorem – Applications – Air foil and Atomizer.

2.4 Viscosity

Viscous force – Coefficient of viscosity – Unit dimension - Poiseuille’s formula (no derivation). Stokes formula - Variation of viscosity with temperature - Numerical problems.

2.5 Surface tension

Surface tension - Surface energy – Relation between S.T and Surface energy (Proof) – Expression for excess of Pressure inside a spherical drop and bubble (no derivation) – Problems.

2.6 Simple Harmonic Motion

Definition of Simple Harmonic Motion – Examples – SHM as projection of uniform circular motion on any diameter of a circle – Equation of SHM – Period, frequency, amplitude, phase motion – Transverse and longitudinal waves. Definition of wavelength and frequency – Derivation of relation $v = f\lambda$ - free vibration – forced vibration – Resonance – Ultrasonic Applications.

UNIT – III

3.1 Optics

Snell’s law of refraction – Critical angle – Total internal reflection – Optical fiber Convex and concave mirror – Focus, image formed by mirror (Qualitative idea only), Mention the formula $1/u + 1/v = 1/f$, (no derivation) – Convex and concave lens, focus image formed by lenses(qualitative idea only), mention the formula $1/f = (n-1)[1/R_1 - 1/R_2]$, no derivation. Simple microscope – magnifying power $m=1+d/f$, No derivation.

3.2 Electricity

Kirchoff’s Laws – Wheatstone’s bridge - Condition for balancing – Magnetic effect of Electricity – Biot and Savart Law – Right hand palm rule – Magnetic field due to current through circular coil at a point on the axial line and at the center (no derivation) – Fleming’s Left hand rule – Force on a current carrying Conductor placed in a magnetic field – moving coil galvanometer – theory and construction – Conversion of a galvanometer into ammeter and voltmeter – Numerical problems.

3.3 Semiconductors

PN Junction – Junction transistor – Transistor configuration, α and β – Common emitter amplifier. Logic gates (symbolic representation and truth task only) – AND, OR, NOT gates – universal gates NAND, NOR, XOR gates.

3.4 Laser

Population inversion, Spontaneous emission, stimulated emission, optical pumping – characteristics – applications.

3.5 Photoelectric Effect

Quantum theory – Photoelectric effect – Laws of photoelectric effect – Einstein’s photoelectric equation – Numerical problems.

REFERENCE BOOKS

- | | |
|------------------------------------|------------------------|
| 1. Physics | - Halliday and Resnick |
| 2. Mechanics | - D.S. Mathur |
| 3. Optics | - Jenkins and White |
| 4. Digital and Computer Principles | - Malvino |

SUBJECT TITLE : APPLIED SCIENCE – B. CHEMISTRY
SUBJECT CODE : GE 103 B
PERIODS/WEEK : 3
PERIODS/YEAR : 96

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	INORGANIC AND THEORETICAL CHEMISTRY	
	1.1 Introduction	9
	1.2 Acid Base & Redox Reactions	9
	1.3 Water	8
	Test – I	1
II	PHYSICAL CHEMISTRY	
	2.1 Electrochemistry	10
	2.2 Corrosion	7
	2.3 Energetics	10
	2.4 Colloids	5
	Test – II	1
III	ORGANIC CHEMISTRY	
	3.1 Introduction	4
	3.2 Polymers	9
	3.3 Paints, Varnishes & Adhesives	6
	3.4 Fuels	9
	3.5 Environmental Pollution	5
	3.6 Chemistry In Action	2
	Test – III	1
	Total	96

OBJECTIVES

UNIT - I INORGANIC AND THEORETICAL CHEMISTRY

Formulae and Equations

- 1.1.1 Review the fundamental ideas in chemistry
- 1.1.2 Explain the terms atom, molecule, valency, radical, molecular formula
- 1.1.3 Compute molecular weight from molecular formula
- 1.1.4 Do the calculations based on simple stoichiometric equations – weight(s)/volume(s) of product(s)/reactant(s)

Structure of Atom

- 1.1.5 Understand the basic ideas related to modern approach to the structure of atom
- 1.1.6 State the fundamental particles – proton, electron, neutron – their charge & mass
- 1.1.7 Differentiate atomic number & mass number
- 1.1.8 Explain the concept of isotopes
- 1.1.9 Describe the dual nature of matter
- 1.1.10 Outline de-Broglie equation
- 1.1.11 State Heisenberg's uncertainty principle
- 1.1.12 Explain the concept of uncertainty
- 1.1.13 Distinguish between orbit & Orbital
- 1.1.14 Illustrate the Hund's rule & Aufbau principle
- 1.1.15 Illustrate the electronic configuration of first 20 elements
- 1.1.16 State modern periodic law
- 1.1.17 Classify elements based on electronic configuration

Chemical Bonding

- 1.1.18 Understand the different types of chemical bonds – how & why they are formed
- 1.1.19 Explain the reason for inactivity of zero group elements
- 1.1.20 Illustrate ionic, covalent & co-ordinate bond
- 1.1.21 Define electro-negativity
- 1.1.22 Explain the polar character of covalent bond & significance of Hydrogen Bonding
- 1.1.23 Illustrate the application of hydrogen bonding – high boiling point of water, density of ice, silky nature of proteins (elementary idea only)

Acid-base & Redox reactions

- 1.4.0 Appreciate the reactions of acids & bases
- 1.4.1 Illustrate Arrhenius' & Lewis concept of acids and bases
- 1.4.2 Distinguish between strong and weak acids and bases
- 1.4.3 Explain neutralization
- 1.4.4 Illustrate the calculation of equivalent weights of acids and bases based on equations
- 1.4.5 Explain the electronic concept of oxidation & reduction
- 1.4.6 State oxidation number
- 1.4.7 Define the O.N concept of oxidation & reduction
- 1.4.8 Illustrate redox reactions taking the reactions in Daniel Cell as example

pH & Its Applications

- 1.5.0 Understand the ionic product of water
- 1.5.1 State pH – understand its expression
- 1.5.2 Describe what is pH scale
- 1.5.3 Solve simple problems
- 1.5.4 Define buffer solutions
- 1.5.5 Describe what is acid buffer & basic buffer – one example each

Volumetric Analysis

- 1.6.0 Understand the theory behind volumetric analysis
- 1.6.1 Describe what is meant by the terms titration, end point & indicator
- 1.6.2 Identify the indicators phenolphthalein/methyl orange to be used in a given acid-base titration, know the respective pH ranges
- 1.6.3 Solve problems based on the relation $V_1N_1=V_2N_2$ & $V_1M_1 = V_2M_2$

Water

- 1.7.0 Understand hard & soft water- definition, types of hardness, its causes & certain methods of removal
- 1.7.1 Distinguish between hard water & soft water
- 1.7.2 Mention the types of hardness
- 1.7.3 Explain methods of removal of hardness – one each (temp. – boiling, permanent – ion exchange)
- 1.7.4 Define degree of hardness
- 1.7.5 Explain the method of determination of degree of hardness using EDTA – principle, procedure & calculation
- 1.7.6 Explain disadvantages of using hard water – wastage of soap in laundry, formation of boiler scales

UNIT - II PHYSICAL CHEMISTRY

Electrochemistry

- 2.1.0 Review the outline of electrolysis, distinguish between electrolytic cells & galvanic cells, identify corrosion as an electrochemical process
- 2.1.1 Distinguish between a) conductors & insulators b) metallic & electrolytic conduction c) strong & weak electrolytes
- 2.1.2 Explain electrolysis taking molten NaCl as example anode reaction & cathode reaction as oxidation & reduction.
- 2.1.3 Explain the applications of electrolysis, electroplating & anodizing
- 2.1.4 Distinguish between electrolytic cell & galvanic cell, the difference in the sign of the electrodes in the above cells
- 2.1.5 Outline the schematic representation of galvanic cell
- 2.1.6 Explain the classification of galvanic cells as primary & secondary
- 2.1.7 Illustrate primary cell with Daniel cell as examples
- 2.1.8 Illustrate secondary cell with lead storage cell as examples
- 2.1.9 Explain the electrode reactions while recharging
- 2.1.10 Explain the term electrode potential
- 2.1.11 Define electrochemical series
- 2.1.12 Illustrate the construction of a galvanic cell – minimum 3 examples
- 2.1.13 Explain the concept of fuel cells (elementary idea only)
- 2.1.14 Explain hydrogen-oxygen fuel cell & methanol-oxygen fuel cell
- 2.1.15 Describe the chemical reactions in the cell
- 2.1.16 Mention the advantages of fuel cells

Corrosion

- 2.2.0 Understand the concept of corrosion & identify it as an electrochemical process
- 2.2.1 Define corrosion
- 2.2.2 Explain the rusting of iron-mention the conditions for rusting
- 2.2.3 Explain the electrochemical theory of corrosion
- 2.2.4 Describe the methods of prevention of corrosion, barrier protection and sacrificial protection
- 2.2.5 Explain the theory behind each method learned

Chemical Energetics

- 2.3.0 Appreciate the basic concepts of ‘Thermodynamics’ & ‘Chemical Thermodynamics’
- 2.3.1 Explain the scope and limitations of thermodynamics
- 2.3.2 Distinguish between a) reversible & irreversible reactions b) exothermic & endothermic reactions
- 2.3.4 Explain ‘system & surroundings’
- 2.3.5 Distinguish between open, closed & isolated systems
- 2.3.6 Define macroscopic properties
- 2.3.7 Distinguish between extensive & intensive properties

- 2.3.8 Describe the different thermodynamic processes like isothermal, adiabatic, isobaric & isochoric process
- 2.3.9 State the first law of thermodynamics
- 2.3.10 Explain internal energy E & ΔE
- 2.3.11 Explain the concept of work & heat
- 2.3.12 State the mathematical expression for the first law of thermodynamics
- 2.3.13 State Hess's Law – only statement & examples (solving problems not expected)
- 2.3.14 Describe the limitations of the 1st law
- 2.3.15 Explain the terms a) 'enthalpy' H & ΔH b) entropy S & ΔS
- 2.3.16 Describe spontaneous & non-spontaneous processes with suitable examples.
- 2.3.17 State 2nd law of thermodynamics
- 2.3.18 Explain Gibb's free energy G & ΔG
- 2.3.19 Derive the mathematical expression (only) for Gibb's – Helmholtz equation
- 2.3.20 State 3rd law of thermodynamics

Colloids

- 2.4.0 Comprehend the methods of preparation, the properties & some industrial applications of colloid
- 2.4.1 Define 'colloids'
- 2.4.2 Illustrate the different types of colloids with examples.
- 2.4.3 Describe the method for the preparation of $\text{Fe}(\text{OH})_3$ sol
- 2.4.4 Describe Bredig's Arc method
- 2.4.5 Describe the purification of colloids by Dialysis
- 2.4.6 Describe the properties 1) Tyndall effect 2) Brownian movement 3) electrophoresis 4) coagulation
- 2.4.7 State Hardy-Schultze rule & explain with examples.
- 2.4.8 Define Gold-No
- 2.4.9 Describe the industrial applications – 1) smoke precipitation 2) sewage treatment 3) purification of drinking water

UNIT – III ORGANIC CHEMISTRY

Introduction to organic chemistry

- 3.1.0 Understand the fundamental ideas of organic chemistry
- 3.1.1 List the differences between organic & inorganic compounds
- 3.1.2 Describe the uniqueness of carbon atom
- 3.1.3 Define 'catenation'
- 3.1.4 Distinguish between saturated & unsaturated compounds
- 3.1.5 Illustrate general classification & that based on functional groups
- 3.1.6 Define isomerism – explain with simple examples only

Polymers

- 3.2.0 Understand the nature of some industrially important polymers
- 3.2.1 Define polymerization
- 3.2.2 Distinguish between addition & unsaturated compounds
- 3.2.3 Differentiate between thermoplastics & thermosetting plastics
- 3.2.4 Outline the merits & demerits of plastics
- 3.2.5 Distinguish natural rubber from synthetic rubber with suitable examples
- 3.2.6 Explain vulcanization & its merits
- 3.2.7 Define "fiber"
- 3.2.8 Describe different types of fibers with suitable examples

Paints, varnishes, adhesives & lubricants

- 3.3.0 Appreciate the requisites of good paints
- 3.3.1 Name the constituents of paints – vehicle, pigment & other additive
- 3.3.2 Identify the role of various additives – acrylics, polymethanes, fillers, plastizisers, driers, antiskinning agents (one examples each)
- 3.3.3 List the two types of varnishes & their constituents
- 3.3.4 State the common uses of varnishes

- 3.3.5 List the various constituents of varnish
- 3.3.6 Explain the principle of lubrication
- 3.3.7 List the types of lubricants – with one example each
- 3.3.8 Define ‘adhesives’
- 3.3.9 List the two types of adhesives
- 3.3.10 State the applications of 1) paper adhesive 2) wood adhesive 3) metal bonding adhesive 4) break & clutch bonding adhesive 5) printed circuits

Fuels

- 3.4.0 Comprehend the classification and use of various types of fuel.
- 3.4.1 Define “fuel”
- 3.4.2 Explain their classification into solid, liquid & gaseous
- 3.4.3 Give brief explanation of solid fuels wood, charcoal, lignite, bituminous coal, anthracite coal – list their applications
- 3.4.4 Explain briefly the liquid fuels petrol, diesel, kerosene & list their applications
- 3.4.5 Explain gaseous fuels natural gas (CNG), producer gas, water gas, LPG & Gobar gas
- 3.4.6 Describe nuclear fuels with examples
- 3.4.7 Define 1) calorific value 2) octane number 3) Cetane no.
- 3.4.8 Explain 1) knocking 2) cracking

Environmental pollution

- 3.5.0 Investigate the impact of pollution on the environment
- 3.5.1 Describe the categorization and sources
- 3.5.2 List the different methods of controlling pollution
 - 1) Effluent treatment 2) removal of toxic gases and particulate materials
- 3.5.3 Distinguish between BOD & COD

Chemistry in action

- 3.6.0 Understand some commonly used medicines & propellants
- 3.6.1 Explain what is 1) dyes 2) antipyretics & analgesics 3) antiseptics & disinfectants 4) tranquilizers 5) antibiotics - mention 2 examples each
- 3.6.2 Define propellants
- 3.6.3 Classify propellants with one example each.

CONTENT DETAILS

UNIT – I INORGANIC AND THEORETICAL CHEMISTRY

1.1 Introduction

Atoms and Molecules, Valency, Molecular formula, Atomic weight, Molecular weight, Chemical equation, Problems based on Chemical equation.

Structure of atom, Modern approach De-broglie & Heisenberg’s uncertainty Principle (Elementary idea only) – Concept of Orbit, orbital, Aufbau, Hund, Pauli’s Principle – Electronic configuration – Modern Periodic Law - classification of elements based on electronic configuration.

Chemical Bonding - theory of valency – Inertness of Zero group elements - Ionic bond, Co-ordinate bond, Co-valent bond, Polar character of covalent bond – Hydrogen bond – Applications High B.P of Water, density of ice, silky nature of protein (Idea only).

1.2 Acids-bases and Redox reactions

Acids-Bases – (Arrhenius, & Lewis Concepts) – Concepts of strong and weak acids & bases – Neutralization - Equivalent weight of acid & bases (Calculate based on Equation) -Oxidation, Reduction (electronic concept and oxidation No concept) - Redox reaction (Eg: - Daniel Cell reaction).

Ionic product of water, pH & pOH (Definition and expression) pH Scale – Calculation of pH & pOH – Buffer solution (examples) – Application of pH a) Boiler feed water b) Potable water c) Effluent treatment.

Volumetric analysis: Quantitative & Qualitative analysis – Units of measurement of Concentration (Normality, Molarity & PPM) – Titration, Endpoint Acid – Base Indicators (Phenolphthalein & Methyl orange) – Choice of Indicators.

1.3 Water

Hard & soft water, Types of Hardness – degree of hardness. One method to remove Temporary hardness (Boiling) – Renormal of permanent hardness (Ion-exchange method) – disadvantages of using hard water a) Wastage of Soap in laundry) Boil Scales – Determination of Degree of hardness using EDTA (Principle & Procedure only).
(Problems not expected from the chapter)

UNIT – II PHYSICAL CHEMISTRY

2.1 Electrochemistry & corrosion

Conductors & Insulators, Metallic & electrolyte conductors, strong & weak electrolytes – Mechanism of electrolysis – Molten Nail – Application of electrolysis – Electroplating & Anodizing.
Galvanic cell – Difference in the sign of electrodes – Primary cell (eg: - Daniel cell construction details, Anode reaction, cathode reaction & Net cell reaction)
Secondary cells – Lead storage battery, (Constructional details – charging & discharging)
Electrochemical series – Application in the construction of a cell.
Fuel cells – Introduction, Hydrogen – Oxygen fuel cell, Methanol – Oxygen fuel (elementary idea only) – Advantages.

2.2 Corrosion

Definition – Rusting of Fe condition for Rusting of Fe, Electrochemical theory of corrosion, Preventing of corrosion
i) Barrier protection
ii) Sacrificial protection
iii) Cathodic protection
iv) Antirust solution.

2.3 Chemical Energetics

Understand the term chemical energetic & thermodynamics _ Scope & Limitations of Thermodynamics. Basic concepts – Reversible & Irreversible reaction, Exothermic & endothermic reactions, systems & surroundings – Types of systems Open, closed, Isolated – process – Macroscopic properties – Extensive & Intensive properties.
Thermodynamic process - Isothermal, Adiabatic, Isobaric, Isochoric Process.
First Law of Thermodynamics – (statement)
Internal energy (E) and Internal energy change (E)
Concept of Work & heat
Mathematical expression for the 1st Law of thermodynamics
Application of 1st Law (Hess's Law)
(Statement and eg), Limitation of 1st Law.
Enthalpy (H) and Enthalpy Change (H), Entropy (S) and Entropy Change (S)
Second Law of Thermodynamics (statement & Mathematical Expression)
Gibbs Free energy (G) and Gibbs free energy change (AG)
Gibbs-Helmholtz equation (expression only)
Third Law of Thermodynamics (statement only)

2.4 Colloids

Definition, Types of colloids, preparation 1) Condensation-e.g. Ferric hydroxide sol 2) Dispersion-e.g. Bredig's arc method, purification – dialysis, Properties. 1. Tyndall effect 2. Brownian movement 3. Electrophoresis 4. Coagulation Hardy – Schulze rule, Gold number Industrial application 1) Smoke precipitation 2) Treatment of sewage 3) Purification of drinking water.

UNIT – III ORGANIC CHEMISTRY

3.1 Introduction

Differences between organic and inorganic compounds – uniqueness of carbon – catenation, saturated and unsaturated – general classification of organic compound – classification based on functional groups isomerism (definition with an example).

3.2 Polymers

Polymerization – illustrate with examples – Addition and condensation polymerization with one example each.

3.3 Plastics - Thermoplastics, Thermosetting plastic, with one example each – advantages.

3.4 Rubber – Natural and synthetic rubber (example), vulcanization.

3.5 Fiber – Natural fibers, synthetic fibers, semi synthetic fibers, examples.

3.3 Paints and Varnishes and adhesives, lubricants

Requisites of a good paint – Constituents – acrylics, polyurethane, filler, plasticizers, pigments, driers and antiskinning agents.

VARNISHES - Type, Constituents

LUBRICANTS - Principle of lubrication – Types of lubricants

ADHESIVES - Types and Applications.

3.4 Fuels

Types of fuels - solid, liquid, gaseous and nuclear - Calorific value of fuels. Knocking, Cracking - Octane number and octane number.

3.5 Environmental pollution

Categorization, Sources and Controlling.

3.6 Chemistry in action:

Dyes – antipyretics and analgesics – antiseptic – disinfectant – tranquilizers – antibiotics (Concept and two examples each). Propellants – definition classification (solid – liquid – hybrid) one example each.

REFERENCE BOOKS

- | | | | |
|----|-------------------------|------------------------------------|-----------------------------|
| 1. | Soni P.L. | A Text Book of Inorganic Chemistry | S.Chand & Co., New Delhi |
| 2. | Puri B.L. & Sharma L.R | A Text Book of Inorganic Chemistry | Shoban Lal Nagin Chand&Co |
| 3. | B.S.Bahl | Text book of Organic Chemistry | S.Chand & Co., New Delhi |
| 4. | I.L. Finar
Arun Bahl | Organic Chemistry – Vol I | ELBS & Longman, Group Ltd., |
| 5. | Sono. P.L. | Textbook of physical Chemistry | Sultan Chand & Sons, New |
| 6. | A.J. Mee | Physical Chemistry | William Heinemann Ltd., |
| 7. | Glasstone & Lewis | Element of Physical Chemistry | Macmillan Press |

SUBJECT TITLE : ENGINEERING GRAPHICS
SUBJECT CODE : GE 104
PERIOD/WEEK : 4
PERIOD/YEAR : 128

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	1.1 Importance of Engineering Graphics	2
	1.2 Drawing Instruments	2
	1.3 Drawing standards	2
	1.4 Free hand Lettering and Numbering	3
	1.5 Dimensioning	3
	1.6 Geometric construction	16
	Test 1	3
		----- 31
II	2.1 Projection of Points, Lines and planes	18
	Test 2	3
III	3.1 Orthographic Projection of Objects	27
	Test 3	3
IV	4.1 Sectional views of objects	11
	4.2 Auxiliary views	3
	Test 4	3
V	5.1 Pictorial Drawing	8
	5.2 Visualization	4
	5.3 Perspective Drawing	3
	5.4 Development of surfaces	11
	Test 5	3
Total		128 Periods

Note : A minimum number of 10 sheets should be done.

OBJECTIVES

UNIT - I

On completion of this study the student should be able to –

1.1 Importance of Engineering Graphics

- 1.1.0 Understand the importance of engineering graphics
 - 1.1.1 Explain the importance of engineering communication medium
 - 1.1.2 Describe the development of engineering graphics and computer aided drafting CAD
 - 1.1.3 Indicate the link between engineering graphics and other subjects of study in diploma courses

1.2 Drawing Instruments

- 1.2.0 Use engineering drawing instruments
 - 1.2.1 Select the proper instrument to draw horizontal, vertical and inclined lines
 - 1.2.2 Select the proper instrument to draw large and small circles and arcs to its specifications
 - 1.2.3 Select the proper pencil to draw different types of line according to its specifications
 - 1.2.4 Identify the steps to keep the drawing clean and tiny

1.3 Drawing standards

- 1.3.0 Appreciate the standards of engineering drawing
 - 1.3.1 Select the drawing sheet
 - 1.3.2 Draw different types of lines
 - 1.3.3 Prepare of title block as per BIS
 - 1.3.4 Fold of drawing sheets as per standards

1.4 Free hand Lettering & Numbering

- 1.4.0 Apply free hand lettering and numbering
 - 1.4.1 Write drawing tile using sloping and vertical lettering including numerals as per BIS
 - 1.4.2 Select suitable size of letters of different layout and applications
 - 1.4.3 Write engineering drawings notes using lettering stencils

1.5 Dimensioning

- 1.5.0 Apply dimensioning as per standards
 - 1.5.1 State the need of dimensioning as per BIS specification
 - 1.5.2 Identify the notations used in a drawing as per BIS
 - 1.5.3 Identify the system of placement of the dimensions as per BIS
 - 1.5.4 Dimension of a given drawing according to BIS including features
 - 1.5.5 Apply the rules for dimensioning of standard features, given a drawing comprising of standard features
 - 1.5.6 Identify principles of dimensioning, given a dimensioned drawing
 - 1.5.7 Identify the correctness or otherwise of an engineering drawing dimensioned as per SP 46 and dimension the same correctly

1.6 Geometric construction

- 1.6.0 Apply principles of geometrical construction
 - 1.6.1 Construct polygon, given the length of the side
 - 1.6.2 Insert a regular polygon in a circle.
 - 1.6.3 Define Ellipse, involutes, helix, Parabola, Hyperbola and Cycloid,
 - 1.6.4 Construct Ellipse by different methods (concentric, eccentricity, parallelogram
 - 1.6.5 Construct an involute, helix, parabola from given data
 - 1.6.6 Identify the application of these constructions in engineering practice.

UNIT – II

2.1 Projection of Points, Lines and Planes

- 2.1.0 Understand the projection of points, lines and planes
 - 2.1.1 Project points in different quadrants
 - 2.1.2 Project lines parallel to both planes
 - 2.1.3 Project lines perpendicular to HP and || to VP
 - 2.1.4 Project lines perpendicular to VP and || to HP

- 2.1.5 Project lines inclined to HP and \parallel to VP
- 2.1.6 Project lines inclined to VP and \parallel to HP
- 2.1.7 Project lines inclined to both planes-simple direct questions and answers
- 2.1.8 Find true length of lines
- 2.1.9 Project of planes parallel to VP and perpendicular to HP
- 2.1.10 Project planes parallel to HP and perpendicular to VP

UNIT - III

3.1 Orthographic Projection of Objects

- 3.1.0 Apply principles of orthographic projection
 - 3.1.1 Explain the principle of orthographic projection with simple sketches
 - 3.1.2 Prepare an engineering drawing of a given simple engineering part in first angle and third angle projection
 - 3.1.3 Draw the orthographic views of an object, given its pictorial drawing
 - 3.1.4 Sketch (free hand) the orthographic views of 3.2 and 3.3
 - 3.1.5 Select the minimum number of views needed to represent a given object fully
 - 3.1.6 Identify the engineering part correctly from a number of orthographic drawings

UNIT - IV

4.1 Sectional views of objects

- 4.1.0 Recognize the need of sectional views
 - 4.1.1 Explain the need to draw sectional views
 - 4.1.2 Select the section plane for a given component to reveal maximum information
 - 4.1.3 Draw the sectional views for 4.2
 - 4.1.4 Sketch simple sections (Full and half) for a range of simple engineering objects
 - 4.1.5 Select the component from a given sectional view

4.2 Auxiliary views

- 4.2.0 Recognize the need of auxiliary views
 - 4.2.1 State whether the auxiliary view is needed, given an engineering drawing
 - 4.2.2 Draw the auxiliary views of a given engineering drawing

UNIT - V

5.1 Pictorial Drawing

- 5.1.0 Prepare pictorial drawing
 - 5.1.1 Explain the need for and types of commonly used pictorial drawings
 - 5.1.2 Prepare isometric drawing of simple objects using appropriate construction procedures given their appropriate drawings
 - 5.1.3 Sketch the isometric views of simple engineering objects given either orthographic drawing or actual components
 - 5.1.4 Prepare oblique drawing – cavalier and cabinet-of simple engineering objects given either orthographic drawings or actual components
 - 5.1.5 Sketch 5.4 by free hand
 - 5.1.6 Identify the correct pictorial view from orthographic drawings

5.2 Visualization

- 5.2.0 Visualize and object in 3D, given its orthographic drawings
 - 5.2.1 Compare an engineering part with its drawings
 - 5.2.2 Identify surfaces with reference to orthographic drawing
 - 5.2.3 Prepare a model of the part, given its orthographic drawing

5.3 Perspective Drawing

- 5.3.0 Prepare perspectives
 - 5.3.1 State the principle of perspective projection
 - 5.3.2 Prepare two-point perspective of a rectangular block
 - 5.3.3 Sketch perspective of combination of rectangular block

5.4 Development of surfaces

5.4.0 Prepare development of surfaces

5.4.1 State the need for preparing the development drawings

5.4.2 Prepare development of surfaces of simple engineering component like tray, funnel, ducts (rectangular and square hopper)

5.4.3 Prepare development of surfaces of 90-degree elbow pipe

CONTENT DETAILS

UNIT - I

1.1 The Importance of Engineering Graphics

Explanation of the scope and objective of this subject – its importance as a graphic communication, Computer Aided Drafting (CAD) need for preparing drawing as per standards – BIS, SP 46.

1.2 Drawing Instruments.

Basic drawing instruments – T square – Set square – compass dividers – drawing boards – Pencils – Drawing papers – Mini drafter – French curves – Stencils – Selection and mode of using them.

1.3 Drawing Standards

Size of drawing sheets – Layouts of drawing sheet – Title Blocks – Types of lines – Folding of drawing sheets.

1.4 Free hand Lettering and Numbering

Need for legible lettering and numbering on drawings – selection of suitable size of lettering for different drawing writing of Engineering drawing titles and notes using both vertical and sloping styles.

1.5 Dimensioning

Function of dimensioning need for dimensioning engineering drawing according to BIS – rotation used in dimensions – dimension line – extension line – arrow heads and leader – system of dimensions - method I and method II

1.6 Geometric construction

Construction of regular polygon given the length of its side - methods of inserting a regular Polygon in a given circle – construction of ellipse by different methods (eccentrically, concentric circle, parallelogram). Definition of involute, helix, parabola & hyperbola – Construction of cycloid helix, involute and parabola.

UNIT – II

2.1 Projection of points, lines and planes

Projection of points in different quadrants, projection of straight lines parallel to one or both planes, parallel to one plane –perpendicular to other – inclined to one plane and parallel to other line inclined to both planes (In first quadrant only)

Methods of finding true length and its inclination with the reference planes. Projection of planes – parallel to one plane and perpendicular to other plane (in first quadrant only)

UNIT - III

3.1 Orthographic projection of objects

Explanation of the meaning of orthographic projection using a viewing box and a model- number views obtained need of only three views for displaying the object. Concept front view, top view and side view-sketching these views for a number of engineering objects- explanation of the meaning of first angle and third angle projection – symbol of projection

UNIT - IV

4.1 Sectional views of objects

Need for sectional drawing of an engineering object- selection of the section plane to reveal the maximum information – sectional views (full and half section) of simple engineering objects.

4.2 Auxiliary views

Need of auxiliary views – auxiliary views given engineering drawings

UNIT - V

5.1 Pictorial drawings

Isometric projection, construction of isometric scales- isometric projection of simple Engineering objects

Oblique projection cavalier and cabinet of simple Engineering objects

5.2 Visualization

Preparation of pictorial views from a group of orthographic drawings

5.3 Perspective drawing

Principle of perspective projection – type of perspective projection – two-point perspective of a rectangular block and combination of two rectangular blocks of different sizes

5.4 Development of surfaces

Development of surfaces of simple engineering components trace-funnel, ducts-rectangular and square –hopper-90 degree Elbow

REFERENCE BOOKS

- | | |
|-------------------------|------------------|
| 1. Engineering Drawing | - N. D Bhutt |
| 2. Engineering Graphics | - K. C. John |
| 3. Engineering Graphics | - P. I. Varghese |

**SUBJECT TITLE : COMPUTER FUNDAMENTALS & PROGRAMMING
IN C**

SUBJECT CODE : GE 105

PERIODS/WEEK : 3

PERIODS/YEAR : 96

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	1.1 Introduction to Computers	12
	1.2 Windows & Word Processing	6
	Test 1	2
II	2.1 Data Processing	5
	2.2 Problem solving methodology	11
	Test 2	2
III	3.1 Introduction to C Programming	12
	3.2 Programming practice	6
	Test 3	2
IV	4.1 Arrays, strings & functions	12
	4.2 Programming practice	6
	Test 4	2
V	5.1 Graphics in C	7
	5.2 Computer Networks	3
	5.3 Programming practice	6
	Test 5	2
	TOTAL	96

OBJECTIVES

UNIT – I

1.1.0 Know the application, classification and working of computers

1.1.1 Define a Computer

1.1.2 Discuss the various applications of computers

1.1.3 List the different classifications of computers based on processing methods

1.1.4 Describe the working of analog, digital and hybrid computers

1.2.0 Appreciate the functions of hardware and software components

1.2.1 Define hardware and software

1.2.2 Discuss about Instruction and program

1.2.3 Describe the hardware functional components of a digital computer with the help of a block diagram

1.2.4 List the functions of ALU, Memory, Input, Output Units and Control Unit

1.2.5 Define CPU and Microprocessor

1.2.6 List the classifications of computers based on capability

1.2.7 Describe micro, mini, mainframe and supercomputers in brief

1.2.8 Discuss machine language, Assembly language and high level language

- 1.2.9 List the different software components
 - 1.2.10 Define system software and application software
 - 1.2.11 Give examples for system software and application software
 - 1.2.12 State the need for translators – assembler, compiler
 - 1.2.13 Define operating system
 - 1.2.14 List the functions of operating system
 - 1.2.15 List the names of various operating system

- 1.3.0 **Appreciate the working of memory and input – output devices**
 - 1.3.1 Define memory
 - 1.3.2 Discuss the units' bit, byte, kilobyte, megabyte, gigabyte etc.
 - 1.3.3 Discuss the characteristics of primary memory and secondary memory
 - 1.3.4 Distinguish between sequential access memory and Random Access Memory
 - 1.3.5 Differentiate between Read Only Memory and Read/Write memory
 - 1.3.6 Discuss RAM & ROM
 - 1.3.7 List the different types of ROM
 - 1.3.8 List the different secondary memory devices
 - 1.3.9 Discuss the working of floppy disk, magnetic tape, Hard disk, Compact disk (block diagrams and detailed description not necessary)
 - 1.3.10 Discuss working of CDROM, CD-R, CD-RW & DVD (block diagrams and detailed description not necessary)
 - 1.3.11 List the names of various I/O devices
 - 1.3.12 Discuss input devices – Keyboard, mouse, scanner, Optical Character reader, Optical Mark reader, bar code reader, digitizer, light pen, joystick in brief (block diagrams and detailed description not necessary)
 - 1.3.13 Discuss output devices – monitor, Printer, plotter (block diagrams and detailed description not necessary)
 - 1.3.14 Describe the printers – Dot matrix printer, Inkjet printer, Laser printer in brief (block diagrams and detailed description not necessary)

- 1.4.0 **Use the provisions of windows o s and word processing**
 - 1.4.0 Define Booting
 - 1.4.1 Define Booting
 - 1.4.2 Demonstrate the features of Windows Operating System
 - 1.4.3 Operate various facilities in windows- 95 or higher version such as Desktop, icon, menu, folder, programs, screen saver, media player, shut down procedure
 - 1.4.4 Discuss word processing
 - 1.4.5 Prepare documents using WORD - create, format, save, print and open documents
 - 1.4.6 Prepare presentations using power point – creation and use of slide show presentations

UNIT – II

- 2.1.0 **Use data processing techniques and DBMS (not for theory exam)**
 - 2.1.1 Define Data, Database, and Database management system
 - 2.1.2 Define Data, Database, and Database management system
 - 2.1.3 State the need of spreadsheet
 - 2.1.4 List the name of electronics spreadsheet and DBMS software packages
 - 2.1.5 Use Excel for the creation, formatting, formula, save, print, open close and exit worksheets
 - 2.1.6 Use Access for the creation, editing and querying of tables

- 2.2.0 **Understand problem solving methodology**
 - 2.2.1 List the various steps involved in problem solving
 - 2.2.2 Define what is an Algorithm
 - 2.2.3 Write Algorithm for solving general and computer related problems
 - 2.2.4 Define what is a Flow chart
 - 2.2.5 Discuss the different flow-charting symbols
 - 2.2.6 Draw flow chart for solving general and computer related problems

- 2.2.7 Define syntax and semantic of programming languages
- 2.2.8 List the name of two programming methods
- 2.2.9 Discuss the characteristics of procedural and object oriented programming languages
- 2.2.10 Give examples for procedural and object oriented language

UNIT – III

3.1.0 Use ‘C’ language in programming

- 3.1.1 Discuss the characteristic of C language
- 3.1.2 Describe the structure of a C program
- 3.1.3 State the need for header files, main ()
- 3.1.4 Discuss the basic data types in C –int., float, and double char
- 3.1.5 Discuss about identifiers, keywords and declaration of identifiers
- 3.1.6 Discuss about statements and compound statements
- 3.1.7 Describe briefly assignment, arithmetic operators, increment-decrement operators and arithmetic expressions
- 3.1.8 Discuss operator precedence and rules for evaluation of an expression
- 3.1.9 State the need of stdio.h
- 3.1.10 Discuss various input and output statements-printf(), scanf(), getchar(), putchar (), getchar ()
- 3.1.11 Discuss the need of various control sequences and escape sequences
- 3.1.12 Write simple programs using input/output assignment and arithmetic statements
- 3.1.13 Describe the relational operators and relational expressions with their precedence in brief
- 3.1.14 Describe logical operators with their precedence in brief
- 3.1.15 Write programs with relational operators and logical operators

3.2.0 Prepare programs involving branching and looping statements

- 3.2.1 State the need for branching statements
- 3.2.2 Describe IF, IF ELSE statement, nested IF and IF Ladder
- 3.2.3 Describe the Switch Statement
- 3.2.4 Write Programs using IF Else and Switch statement
- 3.2.5 State the need for looping statements
- 3.2.6 Discuss the method of looping using While, Do and for loops
- 3.2.7 Write programs using While, Do and For loops

UNIT – IV

4.1.0 Create arrays and strings

- 4.1.1 State the need of arrays
- 4.1.2 Discuss the method declaring arrays and subscripting in arrays
- 4.1.3 Discuss the method of inputting, processing, and outputting values of array element
- 4.1.4 Write program for array processing
- 4.1.5 Write program for linear search and bubble sort
- 4.1.6 Discuss about multidimensional arrays
- 4.1.7 Write programs on multidimensional arrays, matrices manipulation
- 4.1.8 Discuss the declaration of character string
- 4.1.9 Discuss various string input and output functions – gets() and puts()

4.2.0 Understand functions in ‘C’ language

- 4.2.1 State the need for function
- 4.2.2 Compare user defined and library functions
- 4.2.3 Discuss the structure of a user defined function and its calling with or without parameters
- 4.2.4 Define void function
- 4.2.5 Describe various library functions – sin (), cos.(),tan(),exp(), abs(), log(),log10(), POW(), sqrt(), - strlen (), strcpy (), strcmp (), strcat ().
- 4.2.6 Write simple programs on functions and strings

UNIT – V

5.1.0 Use computer graphics in ‘C’ language to prepare programs

- 5.1.1 State the use of graphics.h
- 5.1.2 Define resolution
- 5.1.3 Discuss the functions initgraph(), setcolor(), setbkcolor(), putpixel(), line(), circle(), rectangle(), outtexty()
- 5.1.4 Write programs based on graphics

5.2.0 Understand new trends in information technology

- 5.2.1 Define the work ‘multimedia’
- 5.2.2 Define the word ‘multimedia’
- 5.2.3 Discuss the components required for a multimedia personal computer
- 5.2.4 Define computer network
- 5.2.5 Define LAN, WAN
- 5.2.6 Discuss the concept of Server and nodes
- 5.2.7 Discuss Internet, World Wide Web, and e-mail
- 5.2.8 Discuss Computer virus and anti-virus programs
- 5.2.9 Define artificial Intelligence and discuss its application fields

CONTENT DETAILS

UNIT – I Introduction to Computers & Word Processing

Introduction, application of computers, generations of computers, classification of computers – analog, digital, hybrid Computers, Structure of a computer - Hardware and Software components – Input unit, Output unit, ALU, Memory unit, Control unit, CPU, Microprocessor, micro, mini, supercomputers – machine languages, assembly languages, high level languages – system software, application software – assembler, compiler, operating system – Types of memory – primary memory, secondary memory, sequential access, random access memory, RAM, ROM – magnetic tape, floppy, hard disc, compact disc – input devices, output devices.

Practical sessions on Windows O/S, Word, Power point

UNIT – II Data Processing and Programming Methodology

Practical session on Electronic spreadsheet and DBMS – EXCEL, ACCESS

Steps in problem solving – Algorithm, Flowchart- Flow chart symbols- examples syntax, semantics- types of high level languages – characteristics of high level languages - Types of high level languages – Examples – Procedural and object oriented programming languages

UNIT – III Introduction to C Programming

Characteristics of C-language – structure of a program header files, main (), Statements, compound statements, Data types – Keyword and variables, assignment operators, arithmetic operators, expressions, precedence of operators, order of evaluation – relational and logical operators - Input /output statements - control sequences – escape sequences – branching statements, if, if-else, switch – looping statements while, do, for statements.

Writing Sample programs – Practical session on programming

UNIT – IV Arrays and Functions

Arrays – declaration, processing, searching, sorting – linear search, bubble sort – multi dimensional arrays- matrix manipulations, character strings, string declaration, input/output functions gets (), puts () User defined functions – library functions – structure of functions, calling functions, argument passing, void functions – mathematical and string library functions – math.h, stdio.h, string.h

Writing programs – Practical session on programming

UNIT – V Graphics and Networking

C-Graphics – resolution – graphics functions – initgraph (), setcolor (), setbkcolor (), putpixel (), Line (), circle (), rectangle (), out text (), outtextxy ()

Multimedia – Computer networking

LAN, WAN- Internet, modem, www-E-mail, computer virus, artificial intelligence.

REFERENCE BOOKS

1. Brian w. Kernigham and Dennys M. Ripchie The ‘C’ programming Language PHI
2. Hughes J. K. and Michton J. I. A structured approach to Programming PHI
3. Gottfried.B Theory and problems Programming with C TMH
4. E. Balaguruswamy Programming ANSI C TMH
5. Robert A. Radcliffe Encyclopedia C BPB

SUBJECT TITLE : BASIC ELECTRICAL AND ELECTRONICS
SUBJECT CODE : CT 101/EL 101/EP 101/EI 101/IT 101
EC 101/CHM101/INF 101
PERIODS/WEEK : 4
PERIODS/YEAR : 128

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	Passive Components, A.C. Fundamentals, Poly-phase circuits & Network Theorems Test 1	28 1
II	Semi conductors, PN junction Diodes Different types of diodes Test 2	20 1
III	Diode circuits, Introduction to Transistors Test 3	25 1
IV	Transistor configuration & Biasing Techniques Test 4	25 1
V	Special type of Transistors, Power devices & Opto-Electronic devices Test 5	25 1
	Total	----- 128 =====

OBJECTIVES

UNIT – I

1.1.0 Understand the different types of resistors and their uses

- 1.1.1 Define the property of resistance
- 1.1.2 List the specifications of resistors and state their importance
- 1.1.3 Classify types of resistors
- 1.1.4 List the applications of fixed resistors, variable resistors in electronic circuits.
- 1.1.5 Explain the working of PTC and NTC resistors and their application.

1.2.0 Familiarize with capacitors used in electronic circuits and their applications

- 1.2.1 State the charging and discharging of capacitors
- 1.2.2 List the specification of a capacitor and state their importance
- 1.2.3 Classify capacitors
- 1.2.4 Explain the working of capacitors
- 1.2.5 State the application of each type of capacitors
- 1.2.6 List the use of gang condensers, trimmers, pads.

1.3.0 Familiarize with different types of inductors, transformers and their applications

- 1.3.1 List the different types of inductors and their applications
- 1.3.2 Explain the working principle of a transformers
- 1.3.3 List the types and applications of transformers

1.4.0 Understand the basic network theorems

- 1.4.1 Explain superposition theorem, Thevenin’s theorem, Norton’s theorem, reciprocity theorem and maximum power transfer theorem

1.5.0 Understand the fundamentals of alternating current

- 1.5.1 Define waveform, time period frequency, and amplitude, phase difference r.m.s. Value, average value
- 1.5.2 Derive the equation of sinusoidal voltage and current
- 1.5.3 Explain A.C. through resistors, inductors and capacitors
- 1.5.4 Define Q-factor of a coil
- 1.5.5 Define resonance in R-L-C (Series & parallel circuits)
- 1.5.6 State the inductive reactance, capacitive reactance and impedance
- 1.5.7 Explain the generation of 3Ø voltage equations, phase difference λ vector representation
- 1.5.8 Define line voltage and current, phase voltage and current in 3 Ø system
- 1.5.9 Explain circuits the use of star & Delta connections.

UNIT – II

2.1.0 Recognize the semiconductor materials & devices

- 2.1.1 Sketch Energy Band diagrams of conductors, insulators & semiconductors
- 2.1.2 Distinguish between intrinsic & extrinsic semiconductors
- 2.1.3 State the majority & minority carriers in P, N type materials
- 2.1.4 Explain the term doping
- 2.1.5 Explain the formation of PN junction diode, depletion region
- 2.1.6 Distinguish between drift & diffusion currents
- 2.1.7 Describe potential barrier
- 2.1.8 Sketch V-I characteristics of diode
- 2.1.9 Describe Zener & Avalanche Breakdown of diodes
- 2.1.10 Explain the determination of static & dynamic resistance of diode
- 2.1.11 Explain the specifications of diodes

2.2.0 Recognize different types of diodes

- 2.2.1 Explain the working & VI characteristics of Power, Zener, Varactor & Tunnel diodes
- 2.2.2 Describe important specifications of diodes
- 2.2.3 Describe applications of Power diodes, Zener diodes, Varactor diodes & Tunnel diodes

UNIT – III

3.1.0 Appreciate the principle of rectification and filtering

- 3.1.1 State the working of a diode and a rectifier
- 3.1.2 Draw half wave and full wave rectifier circuits including bridge rectifier and explain their working
- 3.1.3 Draw the relationship between DC output and AC input voltage
- 3.1.4 Define the terms rectification efficiency, ripple factor
- 3.1.5 Calculation of average and r.m.s values of voltages and currents for various rectifiers
- 3.1.6 Draw the filter circuits, different types, shunt capacitor, series inductor and π section filters and explain their working
- 3.1.7 Draw the different wave shapes
- 3.1.8 Draw the voltage Doublers and Tripler circuit and state principle of working

3.2.0 Understand the concept of transistor

- 3.2.1 Explain the working of PNP & NPN transistor
- 3.2.2 Draw the mechanism of current flow and current relation $I_E = I_B + I_C$
- 3.2.3 State the meaning of leakage current and effect of temperature

UNIT – IV

4.1.0 Understand different configurations of transistors

- 4.1.1 Draw the different configuration of transistor
- 4.1.2 Sketch the input and output characteristics of CB & CE Configuration
- 4.1.3 Determination of i/p & o/p resistance from characteristic curves
- 4.1.4 Compare the different configurations of transistor
- 4.1.5 Define and relate the term Gama and Beeta factors

- 4.2.0 Understand different biasing techniques of transistors**
 - 4.2.1 Sketch DC Load line
 - 4.2.2 Define operating point
 - 4.2.3 Explain the need for stabilization of operating point
 - 4.2.4 Study the different biasing circuits
 - 4.2.5 Study the behavior of CE amplifier with potential divider biasing.

UNIT – V

5.1.0 Understand the operation of UJT

- 5.1.1 Study the operation of UJT, VI characteristics & symbol
- 5.1.2 Equivalent circuit of UJT & its Application

5.2.0 Translate the principle of operation of FET

- 5.2.1 Draw the Basic construction of JFET, P-channel and N-channel
- 5.2.2 State the principle of operation and the characteristics of JFET
- 5.2.3 Compare FET with Bipolar Transistor
- 5.2.4 List the advantages and disadvantages
- 5.2.5 List the parameters of JFET
- 5.2.6 Applications of JFET
- 5.2.7 Classify MOSFET such as depletion and enhancement modes
- 5.2.8 Compare JFET and MOSFET
- 5.2.9 Application of MOSFET

5.3.0 Appreciate the concept of integrated circuit

- 5.3.1 Study the basics of integrated circuits
- 5.3.2 List the advantages
- 5.3.3 State the needs for SMD & list the advantages

5.4.0 Recognize the different types of opto electronic devices

- 5.4.1 State the working principles of photo resistors, photodiodes, phototransistors, photovoltaic cells, LEDs, LCDs, and Opto couplers
- 5.4.2 Explain simple application of Opto electronic devices.

CONTENT OUTLINE

UNIT – I:

PASSIVE COMPONENTS, A.C FUNDAMENTALS, POLY-PHASE CIRCUITS & NETWORK THEOREMS

Fixed resistors, variable resistors and their specifications – PTC and NTC resistors, High precision resistors, applications. Capacitors – charging & discharging specification, different types of capacitors, variable capacitors, application of capacitors. Inductors – AFC & RFC, Transformers, pulse transformer, applications.

Equations of sinusoidal voltage & current, waveforms, time period, frequency, amplitude, phase difference, r.m.s value, average value, A.C. through Resistors, Inductors and Capacitor, inductive reactance, capacitive reactance and impedance. Q-factor, resonance in R.L.C. (Series & parallel).

Network theorem's – Superposition theorem, Thevenin's theorem, Reciprocating theorem, Norton,s theorem, Maximum power transfer theorem.

Poly-phase circuits – generation of poly phase voltage, equations, phase difference, e m f vector representation, comparison between single & 3 phase systems, star & delta connections, relations of voltage & current in star/delta connections, expression for power in 3 phase systems – simple problems.

UNIT – II:

SEMI CONDUCTORS, PN JUNCTION DIODES, DIFFERENT TYPES OF DIODES.

Energy band diagram of conductors, insulators, semiconductors, intrinsic & extrinsic semiconductors, doping, P&N type, majority & minority carriers. PN junction, drift & diffusion current, depletion layer, potential barrier, behaviour of PN junction under forward & reverse bias, break down on diodes, Zener & avalanche breakdown. VI characteristic of PN junction diode, determination of static and dynamic resistance, specification of diode

Different types of diodes – brief description, working & VI characteristics of power, zener, varactor and tunnel diodes. Important specification & applications

UNIT – III:

DIODE CIRCUITS, INTRODUCTION TO TRANSISTORS

Working of the diode as a rectifier, half wave & full wave rectifiers, bridge rectifiers. Relation between D.C output and A.C output voltage, rectification efficiency & ripple factor, average & r.m.s values of voltage & current for various rectifiers. Filter circuits, shunt capacitor, series inductance and section filter circuits, applications. Voltage Doubler & Tripler circuits operations.

Concept of bipolar transistor PNP & NPN transistor – Mechanism of current flow, current relation ($I_E = I_B + I_C$). Concept of leakage current (I_{CBO}) and effect of temperature on leakage current.

UNIT – IV:

TRANSISTOR CONFIGURATION AND BIASING TECHNIQUES

CB Configuration leakage current, input & characteristics, determination of dynamic input & output resistance, CE configuration, current relation (Collector current in terms of base current & leakage current I_{CED}), Input & output characteristics, determination of input & output resistance.

CC configuration – expression of emitter current in terms of base current and leakage current

Comparison of CB, CE & CC with regards to input & output impedances, current gain, voltage gain & leakage current.

Transistor biasing techniques – DC load line – Fixing the operating point, Need for stabilization.

Different biasing methods – Working of a single stage CE transistor amplifier.

UNIT – V:

SPECIAL TYPE OF TRANSISTORS, POWER DEVICES & OPTO ELECTRONICS DEVICES.

UJT, Operation, VI characteristics, Equivalent circuit, Applications. FET, advantages and disadvantages, Basic construction of JFET, Principle and operation of JFET, Parameters of JFET, Applications.

MOSFET, Depletion MOSFET, Enhancement MOSFET, Application.

Difference between JFET & MOSFET

Power devices – SCR, diac & triac

Introduction to Integrated ckt technology, Advantages, SMD's and its advantages

Opto electronic devices – working principles of photo resistors, photodiodes, phototransistors, photovoltaic cell, LED, LCD & Opto couplers – simple application of opto electronic devices.

REFERENCE BOOKS

1. Basic Electrical Engineering. : V.N. Mittle
2. Basic Electronics and Linear circuits : Kulshreshtha, Bhargara N.M. & S.C.Gupta TTTI Chandigarh
3. Electronic Devices and circuits : Milman and Halkias
4. Electronic Principles : Malvino
5. Electronic Devices and Circuit Theory : Robert Boylestad and Nashelsky
6. Electronic Devices and Circuits : Allen Mottershead
7. Electronic circuits :Floyd

SUBJECT TITLE : APPLIED SCIENCE LAB - PHYSICS
SUBJECT CODE : GE 106 A
PERIODS/WEEK : 2
PERIODS/YEAR : 64

LIST OF PRACTICAL EXPERIMENTS – PHYSICS

1. Vernier Calipers
2. Screw Gauge
3. Common balance
4. Simple Pendulum
5. Hooke's law
6. Moment bar
7. Inclined Plane
8. Concurrent forces (Mass of the body)
9. Hare's apparatus
10. U-tube
11. Quill tube
12. Resonance column
13. Diode Characteristics
14. Convex lens
15. Ohm's law

SUBJECT TITLE : APPLIED SCIENCE LAB – CHEMISTRY
SUBJECT CODE : GE 106 B
PERIODS/WEEK : 2
PERIODS/YEAR : 64

OBJECTIVES

I. VOLUMETRIC ANALYSIS

1.1 Acidimetry Alkalimetry

- 1.1.a Determine the strength of the given hydrochloric acid solution using a standard solution of sodium hydroxide and calculate the amount of HCl in a given volume
- 1.1.b Determine the strength of given sulphuric acid solution using a standard solution of sodium carbonate. Calculate the amount of sulphuric acid in a given volume
- 1.1.c Determine the strength of given sodium hydroxide solution given a standard solution of sodium carbonate using a known solution sulphuric acid/hydrochloric acid. Calculate the amount of sodium hydroxide in a given volume
- 1.1.d Determine the strength of given nitric acid solution given a standard solution of oxalic acid using known solution sodium hydroxide/potassium hydroxide. Calculate the amount of nitric acid in a given volume.

1.2 Permanganometry

- 1.2.a Determine the strength of given potassium permanganate solution using a standard solution of ferrous ammonium sulphate
- 1.2.b Determine the strength and calculate the amount of crystalline ferrous solution

1.3 Hardness estimation

- 1.3.a Determine the degree of hardness of a given sample of hard water using a standard solution of EDTA.

II. pH DETERMINATION

- 2.1.1 Determine the pH of three different solutions using pH meter
- 2.1.2 Determine the pH value of three different solutions using universal indicator
- 2.1.3 Determine the pH value of three different solutions using pH test paper

III. PREPARATION OF STANDARD SOLUTIONS

- 3.1.1 Weigh accurately a crystalline substance using a chemical balance
- 3.1.2 Prepare a standard solution of sodium carbonate by weighing out accurately solid sodium carbonate and making it into a definite volume
- 3.1.3 Prepare a standard solution of oxalic acid when oxalic acid crystals are given.

CONTENT DETAILS

I. VOLUMETRIC ANALYSIS

- 1.1 Acidimetry Alkalimetry
 - a) Estimation of Hydrochloric acid
 - b) Estimation of Sulphuric acid
 - c) Estimation of Sodium hydroxide given standard sodium carbonate solution
 - d) Estimation of Nitric acid given standard sulphuric acid solution
- 1.2 Permanganometry
- 1.3 Estimation of potassium permanganate
- 1.4 Estimation of crystalline ferrous sulphate
- 1.5 Estimation of sodium hydroxide, given standard ferrous salt solution
- 1.3 Hardness estimation
 - Estimation of total hardness of water – using standard EDTA solution

II. pH DETERMINATION

- 2.1 Determination of pH using pH meter
- 2.2 Determination of pH using universal indicator, pH test paper.
- 2.3 Determination of pH using pH test paper.

III. PREPARATION OF STANDARD SOLUTION

- 3.1 Preparation of a standard solution of sodium carbonates
- 3.2 Preparation of a standard solution of oxalic acid

REFERENCE BOOKS

A.O. Thomas & Mani Practical Chemistry for B.Sc. main

SUBJECT TITLE : SOFTWARE LAB –I
SUBJECT CODE : CT 102/CHM 102
PERIODS/WEEK : 3
PERIODS/YEAR : 96

CONTENT DETAILS

1. Familiarization of Computer, Operating Systems – DOS
 - Booting
 - Disk Drive, file, directory structures
 - DOS Internal and external commandsFamiliarization of printer, its operation procedure
2. Write programs in C for simple mathematical problems
3. Write programs using relational & logical operations
4. Write programs using branching statements
5. Write programs using looping statements
6. Write programs using arrays, multidimensional arrays
 - Matrix manipulation
 - Sorting techniques
 - Searching techniques
7. Write programs with Structures & Union
8. Write programs using Functions
 - Simple functions
 - Recursion
 - Using library functions
9. Write programs on simple graphics

SUBJECT TITLE : BASIC ELECTRONICS LAB
SUBJECT CODE : CT 103/CHM 103
PERIODS/YEAR : 64

EXERCISES

1. Identification of Passive Components: Resistors, Capacitors, Inductors, Transformers, Thermistors, and LDR & familiarization with Breadboards.
2. Identification of various types of Electronic Instruments: Ammeters, Voltmeters, Multimeters (Analog and Digital), Function Generators, Power Supply and CRO.
3. To observe a Sine wave on a CRO and draw it indicating all its values: Amplitude, Time Period and Frequency.
4. Measurement of voltage at various setting (Low and high voltage) of regulated Power supply by using Analog & Digital Multimeters
5. Measurement of voltage and current by loading the regulated Power Supply.
6. Measurement of Resistors by Multimeters and Compare with Colour code value
7. Check an Electrolytic Capacitor using a Multimeter
8. Identification of Package type and Terminal familiarisation with characteristics & Rating using data book for various types of Diodes.
9. Checking of Diode using a Multimeter
10. Draw the VI characteristics (Forward and Reverse) of a silicon Diode. Determine the static and dynamic resistance
11. Draw the VI characteristics (Forward) of a Germanium Diode. Determine static and dynamic resistance.
12. Plot the VI characteristics of Zener diode. Determine the Breakdown voltage
13. Measure and Plot the Input/Output voltages of a half wave rectifier with and without filters. Calculate Ripple Factor
14. Measure and plot the Input/Output voltages of a full wave rectifier with and without filters. Calculate Ripple Factor.
15. Measure and Plot the Input/Output voltages of Bridge Rectifier with and without filters. Calculate Ripple Factor
16. Plot the wave shapers of a full wave rectifier with shunt capacitor, series inductor and π section filter. Measure voltages
17. Setup a voltage regulator using Zener Diode.
18. Construct a voltage Doubler and observe the output
19. Construct a voltage Tripler and observe the output
20. Identification of Package Type & Terminals familiarization with characteristic & Rating using data books for transistors
21. Plot the Input and Output characteristics for a transistor in common base configuration and determine current gain, Input and Output resistance
22. Plot the input and output characteristics for a transistor in common emitter configuration and determine current gain, input and output resistance.
23. Plot the VI characteristics of UJT
24. Plot the VI characteristics of a JFET
25. Familiarization of Ics and SMD

SUBJECT OF STUDY AND SCHEME OF EVALUATION

BRANCH: COMPUTER HARDWARE MAINTENANCE

Semester 3

Code	Subject	Periods Per Week			Evaluation (Marks)			
		Theory	Practical/Tutorial	Total	Theory	Practical	Internal	Total
CM301	Electronics – II	5	1	6	75		25	100
CM302 / CT 302 / IF 302	Digital Computer Principles	5	0	5	75		25	100
CM303	Data Communication	5	1	6	75		25	100
CM304/ CT 304/ IF 304/ EP 304	Object Oriented Programming(C++ & Java)	5	1	6	75		25	100
CM305	Hardware lab – I (Digital Computer Principles)		3	3		75	25	100
CM306	Software Lab – II (C++ & Java)		3	3		75	25	100
CM307	Electronics Lab - II		3	3		75	25	100
	ISAP Skills Development		3	3				
	TOTAL	20	15	35	300	225	175	700

ISAP : Information Search Analysis & Presentation

SUBJECT TITLE : ELECTRONIC CIRCUITS - II
SUBJECT CODE : CM 301
PERIODS/WEEK : 6
PERIODS/SEMESTER : 96

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	Single Stage Transistor Amplifier, Multi stage Transistor Amplifier	18
II	Feed back Amplifier, Tuned Voltage Amplifier and Audio Power Amplifier	18
	Test - I	2
III	Oscillators and Multivibrators	18
IV	Wave Shaping, Time Base and Passive Filters	18
	Test - II	2
V	Operational Amplifier, Voltage Regulator and Timer ICs	18
	Test - III	2
	Total	----- 96 =====

OBJECTIVES

UNIT – I

1.1.0 Understand the concept of a transistor amplifier

- 1.1.1 State the principle of transistor amplifier in CE configuration
- 1.1.2 Study the behavior of the CE amplifier with potential divider type of biasing
- 1.1.3 Determine the AC load line of CE amplifier
- 1.1.4 Calculate the voltage gain, current gain, power gain and I/O impedance
- 1.1.5 State the importance of Emitter Follower
- 1.1.6 Study the circuit of a single stage amplifier using FET

1.2.0 Understand the working of multistage amplifiers

- 1.2.1 Identify the need of multistage amplifier
- 1.2.2 List the different methods of inter stage coupling
- 1.2.3 State the working Principles of RC coupled, Transformer coupled and direct coupled multistage transistor amplifier
- 1.2.4 Explain the frequency response and identify the band width of RC coupled, transformer coupled and direct coupled amplifiers
- 1.2.5 Describe the approximate calculation of voltage gain of a two stage RC coupled amplifier
- 1.2.6 Mention the applications of RC coupled, transformer coupled and direct coupled amplifiers
- 1.2.7 Compare the performance of RC coupled, transformer coupled and direct coupled amplifier
- 1.2.8 Explain the working principle of differential amplifier
- 1.2.9 Define differential mode gain, common mode gain and CMRR
- 1.2.10 Understand the operations and characteristics of a Darlington pair transistor

UNIT – II

2.1.0 Understand the concept of feed back amplifier

- 2.1.1 Describe the positive and negative feed back in amplifier
- 2.1.2 Derive the expression for the gain of feed back amplifier
- 2.1.3 State the types of negative feed back in amplifiers
- 2.1.4 Explain the operation of a typical feed back amplifier circuit
- 2.1.5 Explain the effect of negative feed back on gain stability, distortion, band width, input and output impedance

2.2.0 Understand the operation of tuned voltage amplifier

- 2.2.1 Explain the series and parallel resonance circuit, expression for resonance frequency
- 2.2.2 Recognize the relation between resonance frequency “Q” and band width
- 2.2.3 Explain with circuit the operation and frequency response of single tuned double tuned and staged tuned amplifiers
- 2.2.4 List the applications of tuned amplifiers
- 2.2.5 State the need for neutralization in tuned amplifiers

2.3.0 Understand the working of Audio power amplifiers

- 2.3.1 Distinguish between the voltage amplifier and power amplifier
- 2.3.2 Illustrate the importance of impedance matching in power amplifier
- 2.3.3 Classify the different types of power amplifier class A, Class B, Class AB and class C
- 2.3.4 Explain the operation of a single ended power amplifier circuits
- 2.3.5 Derive the expression for collector efficiency by gracial method
- 2.3.6 State the importance of heat sinks and heat dissipation in power amplifiers
- 2.3.7 Explain the principle of push pull amplifiers circuit
- 2.3.8 Explain the operation of class B push pull power amplifier using output transformer
- 2.3.9 Explain the operation of complementary symmetry push pull amplifier circuit
- 2.3.10 List the advantages, disadvantages and applications of the above push pull amplifier circuit

UNIT – III

3.1.0 Understand the principles of oscillator circuits

- 3.1.1 Explain the concept of oscillator
- 3.1.2 List the types of oscillators
- 3.1.3 State the Barkhacesan’s criterion for oscillation
- 3.1.4 Explain the basic principle of LC oscillators
- 3.1.5 Explain the working of Hartley and Colpitt’s oscillators
- 3.1.6 List the applications of LC oscillators
- 3.1.7 Describe the working of RC oscillations – RC phase shift oscillator and wein bridge oscillator
- 3.1.8 List the applications of RC oscillators
- 3.1.9 State the reason for instability in oscillator circuits
- 3.1.10 Explain the operation of crystal oscillator
- 3.1.11 List the advantages and applications of crystal oscillator

3.2.0 Understand the operation of Multivibrators

- 3.2.1 Name the types of multivibrators
- 3.2.2 Explain the operations of astable multivibrators using transistors
- 3.2.3 Derive the expression for the frequency of oscillation
- 3.2.4 Explain the operation of monostable multivibrator using transistors
- 3.2.5 State the expression for pulse width
- 3.2.6 Describe the operation of Bistable multivibrator using transistors
- 3.2.7 Describe the synchronous and Asynchronous methods of triggering Bistable multivibrator
- 3.2.8 Solve simple problems in multivibrator
- 3.2.9 List the applications of multivibrator

- 3.3.0 Understand the operation of Schmitt trigger**
 - 3.3.1 Explain the operation of Schmitt trigger circuit
 - 3.3.2 Mention UTP and LTP
 - 3.3.3 List the applications of Schmitt trigger

UNIT – IV

- 4.1.0 Understand the linear wave shaping circuits**
 - 4.1.1 Identify the different wave shapes
 - 4.1.2 Define the characteristics of pulse wave form rise time fall time and tilt
 - 4.1.3 Derive the time constant of RC and RL circuits
 - 4.1.4 Draw the RC and RL differentiating and Integrating circuits. State the conditions for proper integration and differentiation
 - 4.1.5 List the applications of integrator and differentiator circuits
- 4.2.0 Understand the non-linear wave shaping circuits**
 - 4.2.1 Classify the diode clipping circuits
 - 4.2.2 Explain the operation of series shunt and biased type clipping circuits with wave forms
 - 4.2.3 Explain the operation of Zener diode clipper circuits
 - 4.2.4 Define the term clamping
 - 4.2.5 Explain the operation of various types of diode clamping circuits
 - 4.2.6 List the applications of clamping circuits
- 4.3.0 Understand the time base circuits**
 - 4.3.1 Identify the need for time base wave form
 - 4.3.2 Define the characteristics of time base wave form - slope error, displacement error, transmission error and sweep speed
 - 4.3.3 Explain the basic saw tooth generation circuit using charging and discharging of a capacitor
 - 4.3.4 Explain the operation of a UJT relaxation oscillator
 - 4.3.5 List the applications of time base circuits
- 4.4.0 Understand the operation of passive filters**
 - 4.4.1 Classify the filter circuits based on functions
 - 4.4.2 Define the pass band stop band and roll rate of filter
 - 4.4.3 Explain the operation of low pass filter, high pass filter and band pass filter
 - 4.4.4 Sketch the frequency responses of the above filter

UNIT – V

- 5.1.0 Understand the working of Op amp**
 - 5.1.1 Draw and explain the block diagram of a general purpose Op amp
 - 5.1.2 Define the electrical characteristic's of Op amp - input offset voltage- input offset current – input bias current – differential input impedance - large signal voltage gain - slew rate
 - 5.1.3 Explain the op-amp circuits - inverting amplifier - non inverting amplifier – difference amplifier – summer – integrator – differentiators
- 5.2.0 Understand the operation of the voltage regulators and timer ICs**
 - 5.2.1 Identify the need for voltage regulator
 - 5.2.2 Explain the working of series and shunt voltage regulator circuits
 - 5.2.3 State the load and line regulation
 - 5.2.4 Explain the working of a simple current limiting protection circuits
 - 5.2.5 State the operation of three terminal voltage regulator ICs – 78 and 79 series
 - 5.2.6 State the use of LM 317 voltage regulator
 - 5.2.7 Draw and explain the block diagram of 555 timer IC
 - 5.2.8 Draw and explain the circuits of astable and monostable multivibrators using 555 IC with wave forms

CONTENT OUTLINE

UNIT - I:

Single Stage Transistor Amplifier And Multistage Transistor Amplifiers

Action of transistor as an amplifier – single stage C.E amplifier circuit with voltage divider biasing – graphical analysis of the small signal CE amplifier – AC load line – Gain, frequency response and bandwidth of BJT amplifier - calculation of voltage gain, input impedance, and output impedance – Emitter follower Single stage common source JFET amplifier

Need for multistage amplifier – gain relations in multistage amplifier – frequency response of cascaded stages – inter-stage coupling methods- classification of multistage amplifiers – two stage RC coupled amplifier using BJT - frequency response - band width - advantages and disadvantages - applications – calculation of voltage gain, input impedance, and output impedance - Two stage transformer coupled and direct coupled multistage amplifier – frequency responses – advantages and disadvantages – applications – differential amplifier – differential mode gain, common mode gain, and CMRR – advantages of differential amplifier – Darlington pair transistor – expression for current gain

UNIT - II:

Feed Back Amplifier, Tuned Voltage Amplifiers, And Power Amplifiers

Types of feed back – derivation for the expression of gain of a feed back amplifier – types of negative feed back amplifiers – explanation with block diagram – typical circuit diagrams of voltage shunt & current series negative feed back amplifier – effect of negative feed back on voltage gain, stability, distortion, bandwidth and input & output impedance

Series and parallel resonant circuits, expression for resonant frequency – relation between resonant frequency, Q factor and bandwidth – single tuned, double tuned, and stagger tuned voltage amplifiers - their working principles and frequency responses - applications of tuned amplifiers – concept of neutralization

Need for power amplifier – difference between voltage and power amplifiers – importance of impedance matching in power amplifiers, transformer impedance matching - classification of power amplifiers – CLASS A, CLASS B, CLASS AB and CLASS C – single ended power amplifier – expression for efficiency of push pull power amplifier – push pull power amplifier with output transformer – complementary symmetry push pull power amplifier – advantages and disadvantages - cross over distortion in CLASS B power amplifier – importance of heat sinks and heat dissipation curves in power amplifiers

UNIT - III:

Oscillators And Multivibrator

Classification of oscillators – Barkhausen criteria for oscillation – LC oscillators. Hartley oscillator, Colpitts oscillator, RC Oscillators: RC phase shift oscillator, Wein bridge oscillator - expression for frequency of oscillation (no derivation) – applications of RC and LC oscillators – crystal oscillator

Types of multivibrator – astable multivibrator using transistor - working principles and wave form – expression for frequency - monostable multivibrator using transistor - working principle and wave form – expression for pulse width (no derivations) - bistable multivibrator using transistor - triggering methods – simple numeric problems on astable and monostable multivibrators

Schmitt trigger circuit using transistor- explanation with waveform – U.T.P, L.T.P, and Hysteresis – applications of multivibrators and Schmitt trigger

UNIT - IV:

Wave Shaping, Time Base Circuit, And Passive Filters

Types of wave forms – ideal pulse wave form – rise time, fall time, and tilt - linear and non linear wave shaping circuits- transient phenomena in RC and RL circuits – RC and RL differentiating and integrating circuits

Clipping circuits – diode clippers – series, shunt, biased, combination and double ended clipper circuits - Zener diode clipper circuits – clamping circuits - diode clampers – positive, negative, and biased type – explain with sine and square wave input

Time base circuit - Need for time base signal - slope and sweep speed – simple method of generation of saw tooth wave form using charging and discharging of a capacitor – U.J.T relaxation oscillator
Passive filters - types of filters – RC low pass filter, high pass filter, band pass filter, band reject – frequency responses and applications

UNIT - V:

Operational Amplifiers, Voltage Regulators And Timer Ics

Block diagram of a general purpose Op-amp - input offset voltage, input offset current, input biased current, large signal voltage gain, differential input resistance, CMRR, slew rate - characteristics of an ideal Op-amp – operational amplifiers circuits – inverting amplifiers, non-inverting amplifier, difference amplifier, summing amplifier- – comparator – voltage follower - integrator, and differentiator circuits.

Voltage regulators – load and line regulation - types of voltage regulators - series and shunt voltage regulator using discrete components – simple current limit protection circuits – 3 terminal voltage regulators – positive regulators (78XXseries) and negative regulators (79XX series) – adjustable voltage regulators using LM 317 – variable voltage power supply using LM 317.

Block diagram of time – IC 555 – working principle - monostable multivibrator using 555 – design and waveform – astable multivibrator using 555 IC – design and wave form.

REFERENCE BOOKS

1. Applied Electronics - R.S.Sedha
2. Basic electronics and linear circuits - Kulshreshtha, D.C. Bhargava, S.C . Guptha
3. Electronics devices and circuit theory - Robert Boyelsted, Lovis Neshelsky
4. Operational amplifiers and linear integrated circuits – Ramakantha Gayakawad
5. Pulse, Digital and Switching Waveforms - Millman & Taub
6. Electronic Devices and Circuits - Allen Mottershed

SUBJECT NAME : DIGITAL COMPUTER PRINCIPLES
SUBJECT CODE : CM 302 /CT 302 /IF 302
PERIODS/WEEK : 5
PERIODS/SEMESTER : 80

<u>UNIT</u>	<u>TOPIC</u>	<u>TIME SCHEDULE</u>	<u>PERIODS</u>
I	Number System and Boolean Algebra		15
II	Combinational Circuits		15
		Test – 1	2
III	Sequential Circuits		15
IV	DAC and ADC		15
		Test - 2	2
V	Memory Design		14
		Test - 3	2
		Total	80

OBJECTIVES

UNIT – I

1.1.0 Understand the various number systems

- 1.1.1 Explain binary, octal, decimal and Hexadecimal number systems
- 1.1.2 Convert decimal nos. to binary, octal and Hexadecimal and vice versa
- 1.1.3 Convert binary to octal, binary to Hexadecimal, octal to binary, octal to Hexadecimal, hexadecimal to binary, Hexadecimal to octal
- 1.1.4 Perform binary addition, subtraction, multiplication and division
- 1.1.5 Perform octal and hexadecimal arithmetic
- 1.1.6 Write 1's complement and 2's complement for a binary number
- 1.1.7 Perform binary subtraction using 1's and 2's complement

1.2.0 Understand binary codes.

- 1.2.1 Discuss the BCD, gray, ASCII, EBCDIC, Excess 3,2421,84-2-1,biquinary,card code
- 1.2.2 State the concept of parity bit for error detection.
- 1.2.3 Explain the odd and even parity methods.
- 1.2.4 Explain Hamming code method of single bit error correction
- 1.2.5 Define Boolean function.
- 1.2.6 State the postulates of Boolean algebra.
- 1.2.7 State the basic theorems in Boolean algebra.
- 1.2.8 State and prove De-Morgan's Law.
- 1.2.9 State the need of truth tables.
- 1.2.10 Draw the truth tables for functions.
- 1.2.11 Explain the sum of product and product of sum forms.
- 1.2.12 Simplify equations using K maps up to 4 variables.
- 1.2.13 State the don't care condition.
- 1.2.14 Develop simplified logic circuits for a given problem.

UNIT – II

2.1.0 Understand combination circuits and logic families

- 2.1.1 Define combination circuits
- 2.1.2 Explain basic gates AND, OR, NOT with truth tables
- 2.1.3 Realize functions using basic gates
- 2.1.4 Explain NAND, NOR, and XOR gates with truth tables
- 2.1.5 Develop AND, OR gates using NAND NOR gates
- 2.1.6 Realize the functions using NAND, NOR and XOR gates

- 2.1.7 Design BCD to excess-3 code converter.
- 2.1.8 Design BCD to seven-segment code converter.
- 2.1.9 Design half adder and full adder (AND-OR, NAND-NAND)
- 2.1.10 Design half Subtractor and full Subtractor (AND-OR, NAND-NAND)
- 2.1.11 Explain 3 bit and 4 bit magnitude comparator
- 2.1.12 Define decoder and encoder.
- 2.1.13 Design 3-8 line decoder using AND gates.
- 2.1.14 Design 8-3 line encoder using OR gates.
- 2.1.15 Define multiplexer / Demultiplexer
- 2.1.16 Draw the block diagram of a multiplexer
- 2.1.17 Construct logic circuit for 8-to-1 line MUX
- 2.1.18 List the applications of multiplexer
- 2.1.19 Draw block diagram of Demultiplexer
- 2.1.20 Construct logic circuit of 1-to-8 line de-multiplexer
- 2.1.21 Implement combinational circuit for 8 input logic function using MUX.

UNIT – III

3.1.0 Understand sequential circuits

- 3.1.1 Define sequential circuits
- 3.1.2 State the use of clock in sequential circuits.
- 3.1.3 Distinguish between combinational and sequential circuits
- 3.1.4 State the basic principle of flip flops
- 3.1.5 Illustrate how flip flop acts as a memory device (using NAND & NOR gates)
- 3.1.6 Draw the block diagram and truth table of RS and D latches
- 3.1.7 Draw the block diagram and truth table of JK and T Flip Flop.
- 3.1.8 Define edge triggering
- 3.1.9 Discuss about preset and clear inputs
- 3.1.10 Discuss the Race around condition
- 3.1.11 State the need of master-slave flip flops
- 3.1.12 Describe briefly the working of master-slave JK flip flops
- 3.1.13 List the different types of registers
- 3.1.14 Draw the block diagram of Serial in serial out shift register and explain
- 3.1.15 Draw the block diagram of serial in parallel out shift register and explain

3.2.1 Understand binary counters

- 3.2.2 List the different types of counters
- 3.2.3 Differentiate between synchronous and asynchronous counters
- 3.2.4 Draw the circuit diagram of an asynchronous ripple counter and explain with the wave forms and state table
- 3.2.5 Define modulo- n counter
- 3.2.6 Design modulo – n counters using T Flip flop and JK flip flops
- 3.2.7 Design up-down counters

UNIT – IV

4.1.0 Understand D to A and A to D converters and more logic circuits

- 4.1.1 Define accuracy
- 4.1.2 Define resolution
- 4.1.3 Calculate accuracy and resolution for DAC
- 4.1.4 Draw the block diagram of simple binary weighted DAC
- 4.1.5 Explain simple binary weighted DAC
- 4.1.6 Explain briefly R- 2R ladder type network for DAC

4.2.0 Define ADC

- 4.2.1 Define & calculate resolution for ADC
- 4.2.2 Theory and block diagram of counter-ramp type ADC
- 4.2.3 List the advantages and disadvantage of counter ramp type ADC
- 4.2.4 Draw the block diagram of successive approximation ADC

- 4.2.5 Explain briefly successive approximation ADC
- 4.2.6 List the advantages and disadvantages of SA- ADC

UNIT V

5.1.0 Understand Memory Design

- 5.1.1 Define RAM and ROM
- 5.1.2 Draw the block diagram of RAM
- 5.1.3 State the steps to read and write operations in RAM
- 5.1.4 Explain static RAM with a neat circuit diagram
- 5.1.5 Draw logic diagram and symbol of static RAM bit slice model.
- 5.1.6 State the advantages of DRAM
- 5.1.7 Draw logic diagram and symbol of DRAM bit slice model.
- 5.2.1 Draw the block diagram of ROM
- 5.2.2 Explain ROM design using diodes
- 5.2.3 Explain internal logic of 32 x 8 ROM
- 5.2.4 Using a circuit diagram explain ROM programming using decoder
- 5.2.5 Design Combinational circuit implementation using ROM
- 5.2.6 Define Programmable Logic Array
- 5.2.7 Design PLA with 3 input and 2 output

CONTENT OUTLINE

UNIT – I

Number systems – Binary, Octal, Decimal, Hexadecimal – Base conversion – Binary arithmetic – addition, subtraction, multiplication, division – Binary subtraction using 1's and 2's complement. Binary codes – BCD, Gray, ASCII, EBCDIC, Excess-3, – Parity bits. Boolean algebra–Product of sum form - Sum of product form - simplifications of Boolean functions – K-map.

UNIT – II

Logic gates – AND, OR, NOT, NAND, NOR, XOR gates – Realization of Boolean functions using gates and universal gates.

Combinational circuit design – BCD to excess-3 code converter – BCD to seven segment code converter – Binary adders – Half adder, Full adder – Design of Decoder and Encoder – Design of Multiplexer and Demultiplexer – Combinational logic implementation using MUX.

UNIT – III

Sequential circuit design – Clocked sequential circuit – RS and D latches – Flip Flops – JK, T and Master Slave JK – Shift registers – serial in serial out – serial in parallel out.

Binary counters – Asynchronous (ripple) counter – Synchronous binary counter – Up-down binary counter – Mod-N counter.

UNIT – IV

Digital to analog conversion – Binary weighted DAC – R-2R ladder type network for DAC – Analog to digital conversion – Ramp type ADC – Successive Approximation ADC

UNIT – V

Memory Design – Static RAM cell design – Internal structure of SRAM – Dynamic RAM design – Internal Structure of DRAM – ROM design – Diode ROM – ROM design using Decoder – Combinational circuit using ROM – Programmable Logic Array - Design

REFERENCE BOOKS

1. Logic and Computer Design Fundamentals (2 Ed.) – M.M. Mano (Pearson Education)
2. Digital computer fundamentals – Thomas S Bartee
3. Fundamentals of digital circuits – A. Anand Kumar
4. Digital Electronics – Thomas L Floyd

SUBJECT TITLE : DATA COMMUNICATION
SUBJECT CODE : CM 303
PERIODS/WEEK : 6
PERIODS PER SEMESTER : 96

UNIT	TOPIC	TIME SCHEDULE	PERIODS
I	Introduction to data Communication		18
II	Transmission Media		18
		Test – 1	2
III	Data Encoding		18
IV	Data Communication Interface		18
		Test - 2	2
V	Error Correction , Detection & Multiplexing		18
		Test - 3	2
		Total	96

OBJECTIVES

UNIT I

1.1.0 UNDERSTAND DATA COMMUNICATION

- 1.1.1 State the need for data communication
- 1.1.2 Explain Simplified data communication model
- 1.1.3 Discuss Data transmission terminology
- 1.1.4 Study frequency spectrum, bandwidth
- 1.1.5 Study about channel capacity and baud rate
- 1.1.6 Compare data rate and bandwidth
- 1.1.7 Study time domain concept
- 1.1.8 Study frequency domain concept
- 1.1.9 Distinguish between analog and digital data transmission
- 1.1.10 Explain Shannon's theorems related to data communication –Source coding theorem and channel coding theorem
- 1.2.1 Describe Transmission impairments
- 1.2.2 Explain attenuation
- 1.2.3 Study delay distortion
- 1.2.4 Study Noise – thermal, inter-modulation, cross talk, impulse noise
- 1.2.5 Discuss Nyquist bandwidth

UNIT II

2.1.0 UNDERSTAND TRANSMISSION MEDIA

- 2.1.1 Study the factors to choose transmission media
- 2.1.2 Distinguish between guided and unguided transmission media
- 2.1.3 Explain twisted pair cable – unshielded and shielded
- 2.1.4 Explain co-axial cable
- 2.1.5 Explain optical fiber cable
- 2.1.6 Compare guided transmission media

- 2.2.1 Study unguided transmission techniques
- 2.2.2 Explain terrestrial micro-wave transmission
- 2.2.3 Explain satellite microwave transmission
- 2.2.4 Explain broadcast radio transmission
- 2.2.5 Explain infrared transmission
- 2.2.6 Study transmission characteristics of wireless transmission
- 2.2.7 Explain communication system through optical fiber
- 2.2.8 Define SONET/SDH

UNIT III

3.1.1 UNDERSTAND DATA ENCODING

- 3.1.2 Compare digital signal and digital data
- 3.1.3 Study digital data to digital signal encoding
- 3.1.4 Understand digital signal encoding formats
- 3.1.5 Understand NRZ and Manchester encoding in detail
- 3.1.6 Study Digital data to analog signal encoding
- 3.1.7 Explain digital modulation techniques such as ASK, FSK, PSK
- 3.1.8 Study analog data to digital signal encoding
- 3.1.9 Explain different modulation methods – PCM, Delta modulation
- 3.1.10 Study the need of digitizer
- 3.1.11 Study analog data to analog signal encoding
- 3.1.12 Explain amplitude modulation
- 3.1.13 Explain frequency modulation
- 3.1.14 Explain image data transfer coding
- 3.1.15 Explain video data transfer coding

UNIT IV

4.1.1 INTRODUCTION TO DATA COMMUNICATION INTERFACE

- 4.1.2 State different data transmission methods
- 4.1.3 Explain asynchronous data transmission
- 4.1.4 Explain synchronous data transmission
- 4.1.5 Define topology
- 4.1.6 Explain Half-duplex transmission
- 4.1.7 Explain full-duplex transmission
- 4.1.8 Study generic interface to transmission medium
- 4.1.9 Study mechanical, electrical, functional and procedural characteristics of Interfacing
- 4.1.10 Study various pin functions of EIA-232 interface
- 4.1.11 Study about ISDN interface
- 4.2.1 State the need of Data Flow Control
- 4.2.2 Study different flow control mechanisms
- 4.2.3 Explain stop-and-wait flow control
- 4.2.4 Explain sliding-window flow control

UNIT V

5.1.1 UNDERSTAND ERROR DETECTION AND CORRECTION

- 5.1.2 Study various Sources of Error
- 5.1.3 Illustrate Parity check
- 5.1.4 Study CRC – Cyclic Redundancy Check method
- 5.1.5 Explain error Control methods
- 5.1.6 Study stop-and-wait ARQ
- 5.1.7 Study Go-back-N ARQ
- 5.1.8 Study Selective-Reject ARQ

5.2.1 INTRODUCTION TO MULTIPLEXING

- 5.2.2 State the need of multiplexing in Data communication
- 5.2.3 Study Frequency Division Multiplexing-FDM

- 5.2.4 List the Characteristics of FDM
- 5.2.5 Study Time Division Multiplexing-TDM
- 5.2.6 List characteristics of TDM
- 5.2.7 Study Wave Division Multiplexing
- 5.2.8 Study Statistical Time Division Multiplexing
- 5.2.9 List the Characteristics of Statistical TDM

CONTENT OUTLINE

UNIT I

Data communication model – Data transmission terminology – Frequency spectrum – Bandwidth – Channel capacity – Baud rate – Data rate – Time domain – Frequency domain – Analog and digital data transmission – Shannon’s theorems – Source coding theorem – channel coding theorem – Transmission impairments – Attenuation – Delay distortion – Noise – Nyquist bandwidth

UNIT II

Transmission medias – Guided media – twisted pair cable – co-axial cable – optical fiber cable – Guided transmission techniques – Terrestrial micro-wave transmission – Satellite microwave transmission – Broadcast radio transmission – Infrared transmission – Characteristics of wireless transmission – Communication system through optical fiber – SONET/SDH

UNIT III

Data encoding – Digital signal and digital data – Encoding formats – NRZ – Manchester encoding – Digital data to analog signal – Modulation techniques – ASK – FSK – PSK – Analog data to digital signal – Modulation methods – PCM – Delta modulation – Need of digitizer – Analog data to analog signal – Amplitude modulation – Frequency modulation – Image data transfer – Video data transfer

UNIT IV

Communication interface – Data transmission methods – Asynchronous data transmission – synchronous data transmission – Topology – Half-duplex transmission – Full-duplex transmission – Characteristics of Interfacing – EIA-232 interface – ISDN interface – Data Flow Control – Flow control mechanisms – Stop-and-wait flow control – Sliding-window flow control.

UNIT V

Error detection and correction – Sources of Error -Parity check – Cyclic Redundancy Check – Stop-and-wait ARQ – Go-back-N ARQ – Selective-Reject ARQ – Multiplexing – Frequency Division Multiplexing – Time Division Multiplexing – Wave Division Multiplexing – Statistical Time Division Multiplexing

REFERENCE:

1. DATA & COMPUTER COMMUNICATION by William Stallings Eastern Economy Edition – PHI)
2. Principles of DIGITAL COMMUNICATION SYSTEMS and COMPUTER NETWORKS by Dr. V.K.K. Prasad (Dreamtech press)
3. Data Communications by D.R. Doll (John Wiley & Sons)
4. Data Communication, Computer networks and Open system By Fred Halsal - Pearson

**SUBJECT TITLE : OBJECT ORIENTED PROGRAMMING
(C++ and Java)**
SUBJECT CODE : CM 304/ CT304 /IF 304 / EP 304
PERIODS/WEEK : 6
PERIODS/SEMESTER : 96

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	Introduction to Object Oriented Programming	20
II	Overloading & Inheritance in C++	18
	Test – 1	2
III	Pointers & Files in C++	16
IV	JAVA Fundamentals	18
	Test - 2	2
V	Interactive programming in Java	18
	Test - 3	2
	Total	96

OBJECTIVES

UNIT – 1

1.1.0 Understand the object oriented programming

- 1.1.1 Explain object oriented approach
- 1.1.2 Explain the organization of data and functions on OOP
- 1.1.3 Study objects, classes, data abstraction and encapsulation inheritance, Polymorphism, dynamic binding
- 1.1.4 Explain the benefits of OOP
- 1.1.5 List the applications of OOP

1.2.0 Understand the c + + programming basics

- 1.2.1 List keywords of C + + other than C
- 1.2.2 Explain access specifiers private and public
- 1.2.3 Study the dynamic initialization of variables
- 1.2.4 Study the reference variables
- 1.2.5 List the operators in C++
- 1.2.6 Study constructors and destructors
- 1.2.7 Study parameterized, dynamic, and overloaded constructors.
- 1.2.8 Explain the declarations and advantages of inline functions
- 1.2.9 Study passing objects to functions
- 1.2.10 Study Returning objects from functions
- 1.2.11 Explain the declarations and accessing of array of objects
- 1.2.12 Explain friend functions and its necessity

UNIT – 2

2.1.0 Understand overloading

- 2.1.1 Study the concept of overloading
- 2.1.2 Study function overloading and operator overloading
- 2.1.3 Study how to overload unary operators and binary operators

2.2.0 Understand Inheritance

- 2.2.1 State the necessity for inheritance
- 2.2.2 Explain the relation between base class and derived class
- 2.2.3 Give the syntax for defining a derived class
- 2.2.4 Explain protected access specifier
- 2.2.5 Compare public, protected, and private inheritance
- 2.2.6 Study multilevel inheritance, multiple inheritance & hybrid inheritance
- 2.2.7 Explain classes within class

UNIT – 3

3.1.0 Know Pointers

- 3.1.1 Understand pointers
- 3.1.2 Study about memory management
- 3.1.3 Discuss of new and delete
- 3.1.4 Study about “this” pointer

3.2.0 Understand Files

- 3.2.1 Define stream
- 3.2.2 Study about file stream
- 3.2.3 Study the modes for opening file
- 3.2.4 Explain some file functions like write(), read(), get(), put(), tell(), seekp(), tellg(), seek().

UNIT - 4

4.1.0 Overview of Java

- 4.1.1 Explain the evolution of Java
- 4.1.2 Discuss Java in connection with Internet and C#
- 4.1.3 Explain need for Security and Portability
- 4.1.4 Explain Bytecode, JVM & Java Runtime environment

4.2.0 Understand Features of Java

- 4.2.1 Discuss Simplicity, Robustness, Multithreading and Platform independency
- 4.2.2 Discuss Java keywords, data types and importance of Unicode
- 4.2.3 Discuss various Control statements, Arrays, and Operators
- 4.2.4 Illustrate Classes and Methods
- 4.2.5 Explain Class Fundamentals and Command line arguments
- 4.2.6 Explain in detail: “public static void main (String args[])”
- 4.2.7 Discuss Nested classes and inner classes
- 4.2.8 Explain Inheritance and types of inheritance, abstract classes
- 4.2.9 Discuss packages, interfaces

UNIT – 5

5.1.0 Understand Exception Handling and Multithreading

- 5.1.1 Discuss exception Handling and Multithreading
- 5.1.2 Discuss fundamentals of Java Network programming

5.2.0 Understand Java Input Output

- 5.2.1 Study the uniqueness of Java I/O
- 5.2.2 Explain streams
- 5.2.3 Distinguish Byte stream and character stream
- 5.2.4 Explain the general I/O classes

5.3.0 Know Internet Programming in Java

- 5.3.1 Define Applet
- 5.3.2 Explain Applet Architecture and life cycle of an applet
- 5.3.3 Differentiate Applets and Midlets
- 5.3.4 Define Servlets
- 5.3.5 Compare application programs, applets and servlets

CONTENT OUTLINE

UNIT - 1

Characteristics of object – class – inheritance – polymorphism – overloading encapsulation – dynamic binding – access specifiers – dynamic initialization of variables – operators – reference variables
Constructors and destructors – memory allocation of objects and classes – inline functions – objects as arguments – returning objects – Array of objects - friend functions

UNIT - 2

Function overloading – overload unary and binary operators –Inheritance – base class – derived class – protected access specifiers – class hierarchies – types of inheritances – classes within class.

UNIT 3

Pointers to objects – dynamic memory management - this pointer – Stream – file streams – modes of opening file – file functions

UNIT 4

Overview of Java, Java Features, programming features, Classes and Methods

UNIT 5:

Advanced Programming features, Exception Handling and Multithreading ,Java Input Output classes, Internet programming, Applets, Servlets

Reference Books:

1. “Object oriented programming in C + +” - Balaguruswami
2. “Java2: The Complete reference” - Herbert Schildt (Tata-McGrawhill)
3. “C++: The Complete Reference” - Herbert Schildt (Tata-McGrawhill)
4. Mastering C++ Venugopal (Tata-McGrawhill)
5. Projects using C++ Varalakshmi (Scitech Publishers)
6. Programming with Java 2 - Xavier (Scitech Publishers)

SUBJECT TITLE	: HARDWARE LAB - I (DIGITAL COMPUTER PRINCIPLES)
SUBJECT CODE	: CM 305
PERIODS PER WEEK	: 3
PERIODS PER SEMESTER	: 48

(Exercise minimum 15 experiments from the following)

1. Design basic gates using transistors and resistors
2. Familiarise logic gate ICs – AND, OR, NOT, NAND, NOR, XOR
3. Realisation of Boolean functions using NAND and NOR gates
4. Design Binary to gray code converter
5. Design Grey to Binary code converter
6. Design BCD to excess-3 code converter
7. Design BCD to seven segment code converter
8. Construct Odd/even parity generators and verify truth table using XOR gates
9. Construct Half adder and Full adder using XOR and AND gates
10. Construct and study 4 to 1 MUX using gates
11. Construct 1 to 4 DEMUX using gates
12. Verify the truth tables of positive edge triggered and negative edge triggered IC Flip Flops (D and JK) and MS-JK Flip Flop
13. Construct 3-bit serial in serial out shift register
14. Construct 3-bit parallel in serial out shift register
15. Construct Ripple counter using JK flip flop
16. Construct Decade counter using JK flip flop
17. Verify the truth table for encoder, decoder, multiplexer and de-multiplexer using ICs.
18. Construct DAC using R-2R ladder network and observe the output waveform

SUBJECT TITLE : SOFTWARE LAB – II (C ++ & JAVA)
SUBJECT CODE : CM 306
PERIODS/WEEK : 3
PERIODS/SEMESTER : 48

LIST OF EXERCISES

1. Simple programs using Class
2. Programs using more than one object with constructors and destructors
3. Programs using array of objects
4. Programs to pass and return objects as arguments
5. Programs using friend functions
6. Programs for overloading unary and binary operators
7. Programs for constructor overloading
8. Programs for file operations
9. Simple programs using Java
10. Implement command line programs using java
11. Implement inheritance using java
12. Implement I/O operations using I/O classes
13. Implement simple applet programs
14. Implement window programs using various AWT tools
15. Implement client server programs using applets and servlets

SUBJECT TITLE : ELECTRONICS LAB - II
SUBJECT CODE : CM 307
PERIODS/WEEK : 3
PERIODS/SEMESTER: 48

LIST OF EXPERIMENTS

1. Design and construct
 - (i) RC differentiator circuit
 - (ii) RC integrator circuitAnd study its pulse response
2. Design, construct and test shunt diode clipper circuits
 - i) Positive clipper
 - ii) Negative clipper
 - iii) Biased clipper
3. Zener diode clipper circuit
4. Design, construct and test various diode clamping circuits
 - (i) Positive clamper
 - (ii) Negative clamper
 - (iii) Biased clamper
5. Construct single stage RC coupled CE amplifier
 - (i) Measurement of operating point
 - (ii) Observing the phase differences between input and output wave forms
 - (iii) Measurement of voltages gain at 1 KHz for different load resistances
 - (iv) Plot its frequency response and determine the band width
6. Construct an emitter follower circuit and measure the gain.
7. Construct a RC phase shift oscillator and measure the frequency of oscillation.
8. Construct a Wein-bridge oscillator using BJT. Measure the frequency of oscillations
9. Construct and test a transistor switching circuit to switch on
 - (i) LED
 - (ii) Relay 12V
10. Design, construct and test a transistor astable Multivibrator for
 - (i) a specified frequency
 - (ii) a specified duty cycle
11. Construct a simple sweep generator and plot its output wave form
12. Assemble a boot strap sweep generator circuit & plot its output wave form
13. Construct a BJT monostable Multivibrator and plot the wave forms at base and collector of the transistor
14. Construct a Schmitt trigger circuit using BJT and observe the output with a sine wave input
15. Construct a UJT relaxation oscillator and measure its frequency and observe waveform
16. Introduction to SPICE
17. Component model and sources
18. Units and values
19. Types of analysis – operating point, transient, AC & DC
20. Simulation of circuits (Transient, AC and DC)
 - (1) Characteristics of Diode, BJT, FET
 - (2) Integrator and Differentiator
 - (3) Rectifiers
 - (4) Amplifiers
 - (5) Oscillators
- Multivibrators
21. Design, construct and test the following using Op-amp 741
 - (1) Inverting amplifier (2) Non-inverting amplifier
 - (3) Difference amplifier (4) Summing amplifier

- (5) Schmitt trigger (6) Zero-crossing detector
- (6) Differentiator circuit (7) integrator circuit
- 22. Monostable Multivibrator using Op-amp 741
- 23. Wien bridge oscillator
- 24. RC Phase shift oscillator
- 25. Setup a voltage regulator using IC723 and plot the regulation characteristics
- 26. Symmetric and asymmetrical Astable Multivibrator using IC 555
- 27. Design, construct and test monostable Multivibrator using 555 IC
- 28. Construct +5V, 1A power supply using IC 7805 and other components
- 29. Construct and test variable power supply using LM 317

Information Search Analysis and Presentation Skills Development

Periods/Week : 3
Periods/Semester : 48

Introduction

The average Engineer walking out of education institution is surprised by the amount of non-technical work he or she faces in the real world (by the amount of personal contact, the number of phone calls, meetings, reports and presentation etc). Further many cannot find appropriate jobs, because of the lack of these skills. The problem aggravates in the case of diploma pass outs who are supposed to have interactions with different cadres in an industrial environment.

The time allotted for ISAP skills development are to be utilized to provide a slice of practical training in a form that may be used in a class room setting. This is not to be taught in a conventional manner. Here the emphasis will shift from teacher oriented methods to students oriented methods. While the information – skills acquired by all students will be same, the actual methods & techniques used by each student will vary according to his or her initiative, enthusiasm, effort taken etc.

These hours are to be taken as a supplement to the theory classes. Students will acquire ISAP skills based on the fundamental knowledge he/she has acquired from the theory sessions.

Objectives

Educational researchers have found that 17 year olds, in a single academic year, learn about 200 to 300 new words, in a university environment. However, during the same period they acquire around 4000 words in their informal home and play environment. That is learning is higher in an informal environment than in an academic one designed specifically for that purpose. The primary objective here is to simulate the informal learning environment.

Student is provided an ideal opportunity to acquire skills in learning to learn which is essential for the professional growth. This will inculcate information skills in the students. These skills will be a life long asset to him or her in fact they grow with age.

Oral and written communication skills are of at most importance to any engineer for a positive professional growth. Emphasis is given for this aspect also.

Activities

A. PART ONE.

Write articles on various technical areas and basic research papers. Students can identify simple projects individually or groups of not more than 4 any technical area. Emphasis here is on the acquisition of ISAP skills.

Source of Information

- a. People
- b. Print media – Magazines, News papers, Journals, Vendors catalogues etc.
- c. Electronic information – CD ROM, Usage of internet – User news groups, WWW.

B. PART TWO

Transparency based Presentation

1. Preparation
 - 1.1 Audience Analysis.
 - 1.2 Information Gathering.
 - 1.3 Transparency design using Power Point/Presentation software.
 - 1.4 Production of transparency for OHP.
2. Delivery

Sample Projects

1. Prepare and deliver transparency based presentations on the topics,
 - a. Technicians are not properly appreciated in the society.
 - b. Engineers do not know about non technical topics.
 - c. Lay people do not know enough about technical topics.
 - d. India's products are not competitive in international markets as its quality is not good.
 - e. India's software professionals are paid too much.
2. Prepare transparency based presentation for the opposite side of the issue you choose in project 1.
3. Prepare and deliver a brief autobiographical presentation.
4. Prepare and deliver a sales promotional presentation (Example – Washing machine, Computer , Air conditioner, Microwave oven or other items related to your branch of study)
5. Prepare and deliver a brief sales promotional presentation on a service (Example- Insurance Policy, Credit cards etc)
6. Prepare and deliver a technical presentation before lay audience (Example – Use of computers to common man, energy saving measures in a domestic environment or other topics related to specific branches of study)

C. PART THREE – COMMUNICATION SKILLS

Written Communication

Preparation of

- a. Reports
 - Formal reports
 - Progress reports
 - Feasibility Reports
 - Laboratory reports.
- b. Technical Proposals.
- c. Email.
- d. User manuals
- e. Job Hunting material
 - Resumes
 - Letters for job hunting
- f. Business letters
- g. Memo, Notices, Agenda and minutes

Oral Communication

Oral communication activities like,

- a. Dyadic communication (Interaction between two persons, example Telephone conversation)
- b. Meetings.
- c. Job interview.
- d. Group Discussions.
- e. Debates.
- f. Case studies.

EVALUATION

There is no separate evaluation for ISAP skills. But the teachers will consider this for the award of internal assessment marks related to the theory subjects in that semester. The performance of the student will be taken equivalent to an Assignment and an Examination while awarding the internal assessment marks.

SUBJECT OF STUDY AND SCHEME OF EVALUATION

BRANCH: COMPUTER HARDWARE MAINTENANCE

Semester 4

Code	Subject	Periods Per Week			Evaluation (Marks)			
		Theory	Practical/Tutorial	Total	Theory	Practical	Internal	Total
CM401	Transducers & Display Systems	5	1	6	75		25	100
CM402/ CT 402/ IF 402	Operating Systems	5	1	6	75		25	100
CM403/ CT 403	Microprocessors and Microcontrollers	5	1	6	75		25	100
CM404	Computer Networks	5	0	5	75		25	100
CM405	Electronics Drafting & Workshop		3	3		75	25	100
CM406	Hardware Lab – II (Microcontroller Lab)		3	3		75	25	100
CM407	Hardware Lab – III (Mini Project)		3	3		75	25	100
	ISAP Skills Development		3	3				
	TOTAL	20	15	35	300	225	175	700

SUBJECT TITLE : TRANSDUCERS AND DISPLAY SYSTEM
SUBJECT CODE : CM 401
PERIODS/WEEK : 6
PERIODS/SEMESTER: 96

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	Types of Transducers	18
II	Temperature transducers photo electric transducers	18
	Test - I	2
III	Displays	18
IV	CRT, LED, LCD	18
	Test - II	2
V	Luminescent and plasma displays	18
	Test - III	2
	Total	96

OBJECTIVES

UNIT – I

- 1.1.0 Understand the principle, operation and application of various transducers
 - 1.1.1 Define the term Transducers
 - 1.1.2 List the various types of Transducers
 - 1.1.3 State the principle and operation of resistor position transducers with diagram
 - 1.1.4 State the working principle and operation of strain gauge
 - 1.1.5 Explain with diagram, the working principle of capacitive transducers
 - 1.1.6 List the applications of capacitive transducers
 - 1.1.7 State the principles of inductive transducers
 - 1.1.8 State the principle of variable inductive transducers
 - 1.1.9 Explain the working principle of LVDT with the diagram
 - 1.1.10 Draw the characteristics of LVDT
 - 1.1.11 State the applications of inductive transducers for the measurement of displacement, velocity and acceleration
 - 1.1.12 Explain the principles and operation of electric transducers with sketches
 - 1.1.13 Explain with the sketches the applications of electric transfer for force and pressure displacement

UNIT – II

- 2.1.0 Understand the importance of transducers and photo electric transducers
 - 2.1.1 State the need of temperature transducers
 - 2.1.2 List the various types of temperature transducers
 - 2.1.3 Explain the principle and operations of resistance temperature detectors with diagrams
 - 2.1.4 Draw the resistance temperature characteristics of typical RTD's
 - 2.1.5 State the principle and operation of thermo couple
 - 2.1.6 State the principle and operation of Thermistor
 - 2.1.7 Draw the temperature resistance characteristics of Thermistor
 - 2.1.8 Compare the merits and demerits of various temperature transducers
 - 2.1.9 Explain the principle and operation of semiconductor temperature transducers
 - 2.1.10 Give the principle and operation of ultra sonic temperature transducer
 - 2.1.11 Identify the need of photoelectric transducers
 - 2.1.12 Draw the constructional details of photo multiplier tube
 - 2.1.13 State the principle of operation of photo multiplier tube

- 2.1.14 State the principle photo conductive cells
- 2.1.15 Explain the principle of photo voltaic cells with diagrams
- 2.1.16 Explain the principle of semiconductor photo diode
- 2.1.17 Draw the characteristics of semiconductor photo diode
- 2.1.18 Explain the principle of phototransistor and its uses
- 2.1.19 Draw the characteristics of phototransistor
- 2.1.20 Summarize the concept and applications of various photoelectric transducers

UNIT – III

- 3.1.0 Understand the principle, operation and application of various display devices
 - 3.1.1 Define the term display
 - 3.1.2 Define information with reference to display
 - 3.1.3 List the types of information
 - 3.1.4 Explain the method of display uses determined by information type
 - 3.1.5 List the characteristics shared by all displays such as power, brightness, resolution, speed, color, temperature, size and visual angle
 - 3.1.6 State the display peripherals and interfacing and give their uses
 - 3.1.7 Draw the characteristics of light
 - 3.1.8 State the mechanism of human eye and its characteristics such as visibility, color and sensitivity

UNIT – IV

- 4.1.0 Understand the working of CRTs, LED's AND LCD's
 - 4.1.1 Define Pixel and Resolution
 - 4.1.2 Discuss Triads and dot pitch
 - 4.1.3 Differentiate between shadow mask and slot mask
 - 4.1.4 Discuss convergence
 - 4.1.5 Discuss horizontal scanning, vertical scanning, raster and retrace
 - 4.1.6 Discuss interlacing
 - 4.1.7 Define bandwidth of a monitor
 - 4.1.8 Draw the constructional details of CRT and name the parts
 - 4.1.9 State the characteristics of raster scan CRTs
 - 4.1.10 State the characteristics of vector scan CRTs
 - 4.1.11 Write the principle of working of high resolution CRT's
 - 4.1.12 List out the criteria for choosing the right CRT for the job
 - 4.1.13 State the LED characteristics such as power requirement, light output, resolution, speed color, size etc
 - 4.1.14 Draw the construction and state the working of seven segment displays with the diagram
 - 4.1.15 List the types of seven segment display
 - 4.1.16 State the principle and working of LED Lear graph displays
 - 4.1.17 Mention the application of bar graph displays
 - 4.1.18 Explain the principles of 5*7 dot matrix LED display with the diagram
 - 4.1.19 Mention a sample application of dot matrix LED display
 - 4.1.20 State the principle of metal insulator metal LCD (MIM)
 - 4.1.21 State the principle of Thin-film-transistor LCD
 - 4.1.22 State the principle of dynamic scattering LCD
 - 4.1.23 State the principle of smectic LCD
 - 4.1.24 Compare the merits and demerits of various types of LCDs
 - 4.1.25 Write the multiplexing of LCD displays

UNIT – V

- 5.1.0 Know about luminescent and plasma display
 - 5.1.1 Draw the construction and state the principles and operation of vacuum fluorescent display
 - 5.1.2 State the characteristics such as power, brightness, resolution, speed colour, size etc.

- 5.1.3 Mention the advantage and disadvantage of VFD
- 5.1.4 Mention a sample application of VFD as a computer display.
- 5.1.5 Draw the construction and state principle and operation of Electro-luminescent display.
- 5.1.6 Give the characteristics of ELD's
- 5.1.7 State the principle of AC thin film ELD drivers
- 5.1.8 Mention a sample application of ELD
- 5.1.9 Draw the construction and state the principle and working of plasma displays
- 5.1.10 Explain the characteristics of plasma displays
- 5.1.11 Differentiate between AC plasma display driving and DC plasma display driving
- 5.1.12 Mention a sample application of plasma display

CONTENT DETAILS

UNIT - I

Introduction – Definition of a Transducer – classification of Transducer, Resistive position Transducers – Strain Gage – Displacement Transducers, Capacitive Transducers, Inductive Transducers – Variable inductance Transducers – LVDT – position – displacement Transducers – Velocity and Acceleration transducers. Force and pressure Transducers

UNIT - II

Temperature Transducers – Resistance temperature detectors – Thermocouples-Thermistors – Semiconductor Temperatures – A transducer ultra sonic temperature Transducers
Photoelectric Transducers – the photo multiplier tube – photo conductive cells or photocells – the photovoltaic cell – the semiconductor photodiode – the phototransistor

UNIT - III

Information – Display use determined by informatics type characteristics shared by all displays – display peripherals and interfacing – light –human eyes and displays.

UNIT - IV

CRTs- characteristics – Raster scan CRTs – Vector scans CRTs – High-resolution CRT displays – choosing the right CRT for the job
LEDs: Characteristics: Seven segment LED displays – LED paragraph displays –5*7 Dot matrix LED displays
LCDs: Characteristics – Twisted pneumatic LCD – metal insulator – metal LCD (MIM-thin film transistor LCD – Dynamic scattering LCD Smectic LCD –Multiplexed LDS.

UNIT – V

Vacuum fluorescent displays (VFD): Characteristics – advantages – disadvantages – sample VFD application – a computer display
Electro luminescent displays (ELD): Characteristics – AC thin film ELD drivers – sample application – a computer display
Plasma displays: Characteristics – DC plasma display driving electronics – AC plasma display driving electronics – sample of plasma application – computer display
Choosing the right display for the job – proper display position and display readability – display interconnection – reliability and EMI – developing display technologies – developing CRT technologies – developing plasma display technologies.

REFERENCE BOOKS

1. Electronic Display Devices – Richard A Perez (TPR Publications, USA)
2. Principles of Interactive computer graphics – Newmann & Spraul

SUBJECT TITLE : OPERATING SYSTEMS
SUBJECT CODE : CM 402 /IF 402 /CT 402
PERIODS/WEEK : 6
PERIODS/SEMESTER : 96

<u>UNIT</u>	<u>TOPIC</u>	<u>TIME SCHEDULE</u>	<u>PERIODS</u>
I	Introduction to OS		16
II	Process management		18
		Test – 1	2
III	Memory Management		18
IV	Device and Information management		18
		Test – 2	2
V	Introduction to Linux & Shell programming in Linux		20
		Test - 3	2
		Total	96

OBJECTIVES

UNIT – 1

1.1.0 Introduction to operating systems

- 1.1.1 Explain the evolution of OS (Early systems)
- 1.1.2 Define OS
- 1.1.3 Describe the abstract view of components of a computer
- 1.1.4 Discuss user view, system view and system goals
- 1.1.5 Discuss storage hierarchy with diagram

1.2.0 Types of Operating System

- 1.2.1 Explain batch systems
- 1.2.2 Distinguish between multi-programming and time-sharing systems
- 1.2.3 Define multi-processor systems
- 1.2.4 Explain the advantages of multi-processor systems
- 1.2.5 Distinguish symmetric multi-processing and asymmetric multi- processing
- 1.2.6 Discuss client-server systems, peer-to-peer systems
- 1.2.7 Discuss asymmetric clustering and symmetric clustering
- 1.2.8 Differentiate soft real time systems and hard real time systems
- 1.2.9 Define various handheld systems
- 1.2.10 Discuss DOS, Unix, Windows, and Linux

1.3.0 Understand Operating System components

- 1.3.1 Discuss process management
- 1.3.2 Discuss main-memory management
- 1.3.3 Discuss file management
- 1.3.4 Discuss secondary-storage management
- 1.3.5 Discuss Networking, protection system and command interpreter system

UNIT - II

2.1.0 Understand Process management

- 2.1.1 Define process
- 2.1.2 Explain the different states of a process with state diagram
- 2.1.3 Explain process control block (PCB) with block diagram
- 2.1.4 Define a thread
- 2.1.5 Briefly explain the advantages of threads
- 2.1.6 Define multi-threading and hyper-threading
- 2.1.7 Distinguish between a program, a process and a thread

- 2.2.0 Understand CPU scheduling concepts**
 - 2.2.1 Describe the various scheduling queues, schedulers with queuing diagram
 - 2.2.2 Explain the use of medium term scheduler with diagram
 - 2.2.3 Explain context switch and dispatcher
 - 2.2.4 Briefly explain burst cycles: CPU and I/O with necessary graph
- 2.3.0 Understand CPU scheduling algorithms**
 - 2.3.1 Differentiate preemptive and non-preemptive scheduling
 - 2.3.2 Discuss the various scheduling criteria
 - 2.3.3 Explain FCFS, SJF, Priority, and RR scheduling algorithms with Gantt chart
 - 2.3.4 Discuss Multilevel and Multilevel feedback scheduling
- 2.4.0 Understand Process synchronization**
 - 2.4.1 Define Critical Section Problem
 - 2.4.2 Define deadlock
 - 2.4.3 Define various deadlock characterizations: mutual exclusion, hold & wait, No pre-emption, Circular wait.

UNIT – III

- 3.1.0 Understand memory management**
 - 3.1.1 State the need of address binding
 - 3.1.2 Compare logical and physical address spaces
 - 3.1.3 Discuss about swapping with diagram
 - 3.1.4 State the need of contiguous memory allocation
 - 3.1.5 Explain memory allocation methods: first fit, best fit, worst fit
 - 3.1.6 Define fragmentation
 - 3.1.7 Explain internal and external fragmentation with compaction
 - 3.1.8 Explain paging with paging hardware diagram
 - 3.1.9 Explain segmentation with segmentation hardware diagram
 - 3.1.10 Explain the advantages of segmentation with paging
- 3.2.0 Understand virtual memory**
 - 3.2.1 Understand the concept of virtual memory
 - 3.2.2 Explain demand paging
 - 3.2.3 Discuss the steps in handling page fault
 - 3.2.4 Explain page replacement algorithms: FIFO, optimal, LRU,
 - 3.2.5 Define the concept of thrashing
 - 3.2.6 Explain briefly about working set model and page – fault frequency

UNIT – IV

- 4.1.1 Understand the file system**
 - 4.1.2 Discuss the file concept
 - 4.1.3 Explain file organisation concepts – sequential, indexed and direct
 - 4.1.4 Explain briefly different file operations
 - 4.1.5 Explain briefly directory structure – single level directory, two-level directory, three structured directories
 - 4.1.6 Explain file system structure with layered file system diagram
 - 4.1.7 Explain briefly different allocation methods – contiguous allocation, linked allocation, indexed allocation with diagrams
- 4.2.1 Understand I/O systems**
 - 4.2.2 Discuss the concept of I/O systems
 - 4.2.3 Explain I/O hardware with bus structure diagram
 - 4.2.4 Explain briefly Kernel I/O subsystem- I/O scheduling, buffering, and caching
 - 4.2.5 Explain the stream structure diagram
 - 4.2.6 Explain the disk structure
 - 4.2.7 Explain briefly the disk scheduling algorithms – FCFS, SSTF, SCAN, C- SCAN

UNIT –V

5.1.0 Understanding Linux

- 5.1.1 Understand the structure of Linux
- 5.1.2 Know kernel and shell
- 5.1.3 Know the Linux file systems
- 5.1.4 Describe briefly the different types of files
- 5.1.5 Know Linux commands viz. date, clear, tput, banner, cal, who, ls, cat, echo, exit, patch, mkdir, rmdir, chdir, cp, rm, mv, more, lp, file, wc, od, split, camp, comm, diff

5.2.1 Understand shell programming

- 5.2.2 Know the shell variable
- 5.2.3 Understand command substitutions
- 5.2.4 Know shell script
- 5.2.5 Know read statement
- 5.2.6 Understand command line arguments
- 5.2.7 Know the logical operators & & and !!
- 5.2.8 Know exit statement
- 5.2.9 Understand the conditional statement
- 5.2.10 Understand the looping statement
- 5.2.11 Know about process, PID
- 5.2.12 Understand process status
- 5.2.13 Describe systems processes
- 5.2.14 Know the mechanism of process creation
- 5.2.15 Differentiate the internal and external commands
- 5.2.16 Illustrate how to run jobs in back ground
- 5.2.17 Discuss the job control in the kern and bash shells

CONTENT OUTLINE

UNIT - 1: INTRODUCTION TO OS

Introduction to operating systems – Evolution systems –Views - Types of Operating System, Operating System components

UNIT – 2 : PROCESS MANAGEMENT

Process management concepts - process - process state - PCB – thread, CPU scheduling concepts - scheduling queues - schedulers - burst cycles, CPU scheduling algorithms - scheduling criteria, Process synchronization – CSP – deadlock – deadlock characterizations

UNIT -3: MEMORY MANAGEMENT

Memory management concepts - address binding - logical and physical address - swapping - contiguous memory allocation - Memory allocation methods - fragmentation – paging - segmentation - advantages of segmentation with paging – virtual memory

UNIT - 4: DEVICE MANAGEMENT & INFORMATION MANAGEMENT

File systems: Concept – file operations - directory structure -file system structure - allocation methods

I/O systems: Concepts - I/O hardware - Kernel I/O subsystem - stream structure -disk structure -

disk management - disk scheduling algorithms

Mass Storage structure: Disk structure, disk scheduling – disk management, disk formatting - boot block- bad blocks

UNIT – 5: INTRODUCTION TO LINUX & SHELL PROGRAMMING

Introduction to LINUX – features of LINUX – structure of Linux – Basic Linux commands – Linux file system – types of files – file commands

Process – process status – systems processes – process creation

Shell variables – command substitutions – command line arguments – conditional statements – logical operators – looping statements – shell programming - – internal and external commands – running jobs in back ground – job control in the Kern and Bash shells

Reference Books:

- | | |
|-----------------------------------|--|
| 1. Operating system concepts | – Silberschatz, Galvin & Gagne (Wiley-6 th Edition) |
| 2. Modern Operating system | – Tanenbaum |
| 3. Unix concepts and applications | – Sumithabha Das |
| 4. Operating Systems | - Balakrishnaprasad (Scitech Publishers) |

SUBJECT TITLE : MICROPROCESSORS AND MICROCONTROLLERS
SUBJECT CODE : CM 403/ CT 403
PERIODS/WEEK : 6
PERIODS/SEMESTER : 96

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	Introduction to micro processor	18
II	Microcontroller Architecture	18
	Test - I	2
III	Programming of 8051	18
IV	Microcontroller Interfacing	18
	Test - II	2
V	Microcontroller Applications	18
	Test - III	2
	Total	----- 96 =====

OBJECTIVES

UNIT - I

1.1.0 Understand the 8085 microprocessor

- 1.1.1 Define microprocessor
- 1.1.2 Draw the functional block diagram of 8085 microprocessor
- 1.1.3 Explain the functions of each block
- 1.1.4 List the general purpose register and special purpose register
- 1.1.5 Explain the functions of various registers
- 1.1.6 Define stack, stack pointer and program counter
- 1.1.7 Give the pin diagram of 8085 microprocessor and explain the functions of each pin
- 1.1.8 Discuss various signals like ALE, SO, SI, OF 8085
- 1.1.9 Discuss the instruction cycle fetch cycle
- 1.1.10 Discuss the four control signals IOR, IOW, MEMR, MEMW
- 1.1.11 Discuss the timing diagram for memory read, memory write, I/O read and I/O write

1.2.0 Understand the various data transfer methods

- 1.2.1 Discuss the various data transfer techniques
- 1.2.2 Explain programmed data transfer
- 1.2.3 Discuss about synchronous asynchronous and interrupt driven data transfer
- 1.2.4 Define DMA
- 1.2.5 List the advantage of DMA
- 1.2.6 Describe cycle stealing and burst mode data transfer in DMA
- 1.2.7 Define an interrupt
- 1.2.8 Discuss the types of interrupts in 8085
- 1.2.9 Explain the interrupt sequence of 8085
- 1.2.10 Discuss about restored interrupts polled interrupts
- 1.2.11 Explain different polling methods – hardware and software
- 1.2.12 Explain maskable and non maskable interrupts
- 1.2.13 Explain the use of interrupts with example
- 1.2.14 Distinguish between I/O mapped I/O and memory mapped I/O

UNIT – II

1.1.0 Understand micro controller architecture

- 1.1.1 Give introduction to micro controllers
- 1.1.2 Discuss the evolution of the micro controller
- 1.1.3 Explain features of micro controllers
- 1.1.4 Discuss the application of micro controller
- 1.1.5 Compare different micro controller – 8 bit 16 bit & 32 bit
- 1.1.6 Describe the pin details and architecture of 8051
- 1.1.7 Explain register structure of 8051
- 1.1.8 Explain special function register 8051
- 1.1.9 Explain different flags
- 1.1.10 Describe internal & external memory of 8051
- 1.1.11 Describe input output pins & ports of 8051
- 1.1.12 Explain counters & timers in 8051
- 1.1.13 Explain serial input/output of 8051
- 1.1.14 Explain interrupt in 8051
- 1.1.15 Describe power deduction modes
- 1.1.16 Discuss different instruction groups of 8051
- 1.1.17 Explain different address methods
- 1.1.18 Explain cross assembler operation manual

UNIT – III

5.1.1 Understand the programming of 8051

- 5.1.2 Explain the instruction set of 8051
 - 5.1.2.1 Data transfer
 - 5.1.2.2 Arithmetic
 - 5.1.2.3 Control transfer

3.2.0 Programming 8051

- 3.2.1 Prepare flowchart and write the programs for :
 - 3.2.1.1 Addition, multiplication, division of two byte and multi byte operands
 - 3.2.1.2 block transfer
 - 3.2.1.3 finding biggest number, average from a set
 - 3.2.1.4 Sorting, Searching
 - 3.2.1.5 Conversion from Hex to BCD
 - 3.2.1.6 Finding Square root
 - 3.2.1.7 Finding LCM, GCD
 - 3.2.1.8 design counter, time delay
 - 3.2.1.9 Serial communication
 - 3.2.1.10 interrupt handling

UNIT – IV

4.1.0 Understand 8255

- 4.1.1 Explain the PPI 8255 with the help of block diagram
- 4.1.2 Explain the I/O mode & Bit set/reset mode of operation
- 4.1.3 Explain the programming of 8255
- 4.1.4 Give illustration for the different modes of operation.

4.2.0 Understand 8257

- 4.2.1 Explain the DMA controller 8257 with the help of necessary block diagrams
- 4.2.2 Describe the control logic of 8257 & various modes of operation

4.3.0 Understand 8259

- 4.3.1 List the features of priority interrupt controller 8259
- 4.3.2 Describe 8259 with the necessary block diagram & pin configuration
- 4.3.3 Discuss the connection diagram of 8259 with the systems
- 4.3.4 Explain the two sets of command words

- 4.3.5 Discuss the priority modes in determining the priorities of the interrupt
- 4.4.0 Understand 8279**
 - 4.4.1 Explain the keyboard & display interface 8279 with the help of block diagram pen details
 - 4.4.2 Describe the keyboard & display sections
 - 4.4.3 Explain the programming of 8279
- 4.5.0 Understand 8251**
 - 4.5.1 State the user of programmable communication interface 8251
 - 4.5.2 Explain 8251 with the help of block diagram and pinpoint diagram
 - 4.5.3 Explain briefly about the transmitter & receiver section with the help of diagram
 - 4.5.4 Describe the programming of 8251
- 4.6.0 Understand 8253**
 - 4.6.1 State the use of Timer 8253
 - 4.6.2 Explain 8253 with the help of block diagram and pin details
 - 4.6.3 Discuss about the programming of 8253
 - 4.6.4 Explain the six modes of operation of 8253

UNIT – V

1.1.0 Applications of Microcontrollers

- 1.1.1 Realize the real time clock & display hours, minutes & seconds
- 1.1.2 Realize traffic light controller
- 1.1.3 Realize hex keyboard interface with the CPU using 8255 (maximum of 24 keys)
- 1.1.4 Realize seven segment display interface
- 1.1.5 Interface a stepper motor with the microcontroller
- 1.1.6 Interfacing DAC with the microcontroller
- 1.1.7 Interfacing ADC with the microcontroller

CONTENT DETAILS

UNIT – I:

INTRODUCTION TO MICROPROCESSORS

Definition - functional block diagram of 8085 – function of different blocks such as ALU, CPU, Accumulator, registers, stack and stack pointers, flag - data bus, pin diagram and functions of each pin
 Various signals such as ALE, IO/M, SO & SI of 8085 – instruction cycle, fetch cycle, machine cycle and execute cycle – timing diagram for IOR, IOW, MEMR, & MEMW
 Programmed data transfer – synchronous, asynchronous and interrupt driven – DMA transfer advantages – cycle stealing and burst modes
 Interrupts – Polled and vectored interrupts – NMI & MI – I/O mapped I/O and memory mapped I/O – use of interrupts – interrupts of 8085

UNIT – II:

MICROCONTROLLER

microcontroller – architecture- evolution - features - application - various microcontroller - 8051 pin details and architecture - register structure- special function register - flags -internal & external memory - input output pins & ports - counters & timers - serial input/output - power deduction modes - instruction groups - different address methods -cross assembler operation manual

UNIT – III:

8051 PROGRAMMING

programming 8051- instruction set - Data transfer- Arithmetic - Control transfer - Programming - flowchart - programs - addition, multiplication, division, block transfer, Biggest number, Sorting, Searching, Hex to BCD, Square root , Average, LCM, GCD, counter , time delay, Serial communication, interrupt handling

UNIT – IV:
INTERFACING

Interfacing chips – Programmable Peripheral Interface, DMA Controller, Priority Interrupt Controller, Keyboard and Display Controller, Programmable Communication Interface, Timer – Architecture, interfacing and programming

UNIT – V:
MICROCONTROLLER APPLICATIONS

Digital clock, traffic light controller, hex keyboard interface, seven-segment display interface, stepper motor control, ADC interfacing, DAC interfacing.

REFERENCE BOOKS

- | | |
|--|---|
| 1. Microprocessor and Microcontroller | - R. Theagarajan – SCITECH |
| 2. Microprocessor architecture, programming and applications with the 8085 | - Ramesh S. Gaonkar |
| 3. The 8051 Microcontroller and Embedded systems | - Muhammed Ali Mazidi, Janice Gillipie Mazidi, (Pearson) |
| 4. Microprocessor & its applications | - R. Theagarajan, S. Dhanasekharan, S. Dhanapal |
| 5. Microcontrollers | - Raj Kamal (Perason) |

SUBJECT TITLE : COMPUTER NETWORKS
SUBJECT CODE : CM 404
PERIODS/WEEK : 5
PERIODS/SEMESTER : 80

UNIT	TOPIC	TIME SCHEDULE	PERIODS
I	Network and Topologies		14
II	LAN components and protocols		15
		Test – 1	2
III	Network addressing		15
IV	WAN and WAN Protocols		15
		Test - 2	2
V	Network management		15
		Test - 3	2
		Total	80

OBJECTIVES

UNIT I

1.0 INTRODUCTION TO NETWORKS AND TOPOLOGIES

- 1.1 Explain the Overview of networking
- 1.2 State the need of networking
- 1.3 State the hardware and software components
- 1.4 Discuss various Network communication standards
 - 1.4.1 Illustrate ISO/OSI reference model
 - 1.4.2 Discuss the functions of each layer
 - 1.4.3 Study TCP/IP reference model
 - 1.4.4 Discuss the functions of each layer
 - 1.4.5 Compare ISO/OSI and TCP/IP models.
- 1.5 Explain different network topologies
 - 1.5.1 Explain Ring, Bus, Star, Mesh and Hybrid topologies
 - 1.5.2 Compare topologies –advantages , disadvantages

UNIT II

2.0 EXPLAIN LAN COMPONENTS AND PROTOCOLS

- 2.1 Know about LAN cables and connectors
- 2.2 Explain LAN devices
 - 2.2.1 Study of Repeater, Hub, Switches
 - 2.2.2 Study Network Interface Card (NIC)
- 2.3 Know about Wireless LAN (WLANs)
- 2.4 Study Lower layer protocols
 - 2.4.1 Explain MAC sublayer
 - 2.4.2 Explain LLC sublayer
- 2.5 Explain ARCnet
- 2.6 Explain Ethernet
- 2.7 Explain different LAN standards
 - 2.7.1 Discuss IEEE 802.2,802.3,802.4,802.5 ,802.11,802.12
- 2.8 Explain Fiber distributed data interface(FDDI)
- 2.9 Explain Middle layer protocols
 - 2.9.1 Explain TCP/IP
 - 2.9.2 Explain IPX/SPX
 - 2.9.3 Explain NETBEUI
- 2.10 Know about higher layer protocols

- 2.10.1 Explain HTTP
- 2.10.2 Explain FTP
- 2.10.3 Explain SMTP

UNIT III

3.0 UNDERSTAND NETWORK ADDRESSING

- 3.1 Introduction to network addressing
- 3.2 Know about TCP/IP addressing scheme
- 3.3 Explain the components of IP Address
- 3.4 Explain IP Address classes
- 3.5 Explain IP subnetting
- 3.6 Explain Variable length Subnet Mask(VLSM)
- 3.7 Discuss Classless Inter Domain Routing (CIDR)
- 3.8 Explain Internet Protocol Version 6 (Ipv6)
- 3.9 Explain IPX/SPX Addressing'
- 3.10 Explain NETBUEI Addressing

UNIT IV

4.0 UNDERSTAND WAN and WAN PROTOCOLS

- 4.1 Explain the overview of WAN
- 4.2 List various WAN Connectivity options
- 4.3 Explain POTS
- 4.4 Explain Leased lines
- 4.5 Discuss ISDN
- 4.6 Discuss Very small Aperture Terminal (VSAT)
- 4.7 Explain Microwave
- 4.8 Explain Radio
- 4.9 Explain Infrared
- 4.10 Discuss Virtual Private Network (VPN)
- 4.11 Explain Working of VPN
- 4.12 Discuss VPN Architecture and Protocols
- 4.13 List WAN devices
- 4.14 Explain Bridges
- 4.15 Explain Routers
- 4.16 Explain Gateways
- 4.17 Discuss Various WAN Protocols
- 4.18 Explain Point to Point Protocols
- 4.19 Explain X.25
- 4.20 Explain Frame relay
- 4.21 Explain Asynchronous Transfer Mode (ATM)
- 4.22 Explain Local Area Network Emulation(LANE)

UNIT V

5.0 UNDERSTAND NETWORKING MANAGEMENT, MONITORING AND TROUBLESHOOTING

- 5.1 Explain network management
- 5.2 Overview of network management
- 5.3 Discuss ISO network management model
- 5.4 Network monitoring and troubleshooting
- 5.5 Simple Network Management Protocol (SNMP)
- 5.6 Explain how SNMP works
- 5.7 Explain Remote monitoring (RMON)

CONTENT OUTLINE

UNIT I

Introduction to Networks and topologies- need of networking- hardware and software components - Various Network communication standards - ISO/OSI reference model - functions of each layer - TCP/IP reference model - functions of each layer - ISO/OSI and TCP/IP models comparison - network topologies – Ring – Bus – Star – Mesh – Hybrid .

UNIT II

LAN Components and Protocols - LAN cables and connectors - LAN devices – Repeater – Hub – Switches - Network Interface Card (NIC) - Wireless LAN (WLANs) - Lower layer protocols - MAC sublayer - LLC sublayer – ARCnet – Ethernet - LAN standards - IEEE 802.2,802.3,802.4,802.5 ,802.11,802.12 - Fiber distributed data interface(FDDI) - Explain Middle layer protocols - TCP/IP - IPX/SPX - NETBEUI - higher layer protocols – HTTP - FTP – SMTP

UNIT III

Network Addressing - TCP/IP addressing scheme - components of IP Address - IP Address classes - IP subnetting - Variable length Subnet Mask(VLSM) - Classless Inter Domain Routing (CIDR) - Internet Protocol Version 6 (Ipv6) - IPX/SPX Addressing - NETBUEI Addressing

UNIT IV

WAN and WAN Protocols - overview of WAN - various WAN Connectivity options – POTS - Leased lines - ISDN - Very small Aperture Terminal (VSAT) - Microwave - Radio – Infrared - Virtual Private Network (VPN) - Working of VPN - VPN Architecture and Protocols - WAN devices - Bridges – Routers – Gateways - WAN Protocols - Point to Point Protocols - X.25 - Frame relay - Asynchronous Transfer Mode (ATM) - Local Area Network Emulation(LANE)

UNIT V

Network management- Overview of network management - ISO network management model - Network monitoring and troubleshooting - Simple Network Management Protocol (SNMP) – SNMP - Remote monitoring (RMON)

REFERENCE

- | | | |
|----|---|--------------------------|
| 1. | Basics of networking | NIIT , PHI |
| 2. | Computer Network | Tenenbaum |
| 3. | Data Communication & Computer Networks | - William Stalling |
| 4. | Computer communication and Network technologies | Micheal A Gallo, Thomson |
| 5. | Networking essential with projects | Palmer Thomson |

SUBJECT TITLE : ELECTRONICS DRAFTING&WORKSHOP
SUBJECT CODE : CM 405
PERIOD/WEEK : 3
PERIODS/ SEMESTER : 48

CONTENT DETAILS

1. Familiarization of components
 - (a) Familiar with shape, size and dimension of various types of passive and active components
 - (b) Mountings of various components
 - (c) Draw the BIS symbols, codes and specification of active and passive components
 - (d) Draw the cabinet and front panel of electronic instruments in view of no. of various controls provision for fuses and heat dissipation ventilation

2. Drawing the circuit of
 - a) Regulated power supply
 - b) Single stage amplifier
 - c) R C phase shift oscillator
 - d) Astable multivibrator using transistor
 - e) Astable multivibrator using 555

3. Drawing the block diagram of
 - a) micro controller,
 - b) T V transmitter & receiver
 - c) A M receiver&F M receiver
 - d) Advanced micro processor
 - e) C R O

4. Preparation of PCB
 - (a) Drawing the circuit diagram of analog and digital circuit functions
 - (b) Layout and artwork procedure –
 - (c) Translating circuit schematic into layout
 - (d) Taping art work for single sided board
 - (e) Print and etch by screen printing wet film and dry film
 - (f) Drilling the board, surface preparation, PTH processing, solder mark testing the boards
 - (g) Cross sectioning the plated through holes
 - (h) Mounting/fixing procedure of components on PCB

5. Soldering and De-soldering Practice

Soldering Iron – specification and selection of Iron – soldering film and solder – simple soldering with tag boards and prepared PCB's – precaution in soldering with PCB's and IC's base – principle of wave soldering

6. PCB design and Practice using available/new computer soft ware

7. Electrical wiring
 - Exercises in house wiring
 - Exercises in Tube light internal wiring
 - Exercises in using switches and relays

SUBJECT TITLE : HARDWARE LAB-III (MINI PROJECT)
SUBJECT CODE : CM 407
PERIODS/WEEK : 3
PERIODS/SEMESTER: 48

Proper importance shall be given to the Mini project of 4th Semester. Students has to develop a simple project based on his knowledge in electronics. Each student must develop a mini project individually. This should be done strictly in the Electronics lab/Workshop. Teachers are requested to monitor it weekly. Specific suggestions/guidance on selecting the project /tools should be given to the students. Each student has to manufacture the Printed circuit board in the Workshop and assemble the components.

A rough record of activities involved shall be prepared by the students weekly and submitted to the staff in charge for verification, correction as well as guidance.

The Fair record shall contain the following:

- (i) Circuit Diagram
- (ii) Components Required
- (iii) Cost & Estimate
- (iv) Testing Records
- (v) Brief note on the applications and further enhancements on mini project

Some examples for mini projects are

- a. Musical alarm
- b. Emergency lamp
- c. Moving display
- d. Audio amplifier
- e. Digital clock
- f. Radio Receiver (AM and FM) or any other circuits

SUBJECT OF STUDY AND SCHEME OF EVALUATION

BRANCH: COMPUTER HARDWARE MAINTENANCE

Semester 5

Code	Subject	Periods Per Week			Evaluation (Marks)			
		Theory	Practical/Tutorial	Total	Theory	Practical	Internal	Total
CM501	Embedded Systems	5	1	6	75		25	100
CM502	Computer, Peripherals & Troubleshooting	5	1	6	75		25	100
CM503/ CT 503	Network Programming	5	1	6	75		25	100
CM504/ CT 504	Advanced Microprocessors	5	0	5	75		25	100
CM505	Hardware Lab - IV (Embedded Systems)		3	3		75	25	100
CM506	Software Lab- III (Operating Systems)		3	3		75	25	100
CM507	Software Lab – IV (Visual Basic)		3	3		75	25	100
	Project & Seminar		3	3				
	TOTAL	20	15	35	300	225	175	700

SUBJECT TITLE : EMBEDDED SYSTEMS
SUBJECT CODE : CM501
PERIODS/WEEK : 6
PERIODS/SEMESTER : 96

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	Introduction to PIC Architecture	20
	Test - I	1
II	PIC Instructions	16
	Test - II	1
III	Advanced Features	17
	Test - III	1
IV	Introduction to Embedded Systems	18
	Test - IV	1
V	Architecture of Embedded Operating Systems	20
	Test - V	1
	Total	----- 96 =====

OBJECTIVES

UNIT – I

Introduction to PIC architecture

- 1.1.0 Discuss PIC
 - 1.1.1 Discuss PIC series of controllers
 - 1.1.2 General features of PIC, and compare 16 C 6X/7X family
 - 1.1.3 Discuss architecture of PIC 16C6X / 7X
 - 1.1.4 Discuss pin details, memory organization, program/data
 - 1.1.5 Define SFR, CPU Registers etc

UNIT – II

Programming of PIC

- 2.1.0 Discuss addressing modes
 - 2.1.1 Direct addressing
 - 2.1.2 Indirect Addressing
- 2.2.0 Discuss instruction set
 - 2.2.1 Byte level instructions
 - 2.2.2 Bit level instructions
 - 2.2.3 Literal and Control instructions

- 2.3.0 Explain different types of instructions
 - 2.3.1 Arithmetic instructions
 - 2.3.2 Logical instructions
 - 2.3.3 Increment/Decrement Instructions
 - 2.3.4 Data Transfer, Clear, Rotate Instructions
 - 2.3.5 Branch and miscellaneous instructions

UNIT –III

Built in advanced features of PIC 16F6X / 7X

- 3.1.0 Discuss various Timer functions
 - 3.1.1 List available built in timers – Timer 0, Timer 1, Timer 2
 - 3.1.2 Discuss Timer 1 modes – Compare and Capture Modes
 - 3.1.3 Discuss about Timer 2 mode – PWM mode
- 3.2.0 Discuss about Synchronous Serial Port modes
 - 3.2.1 List SSP modes – Serial Peripheral Interface and Inter Integrated Circuit
 - 3.2.2 Briefly explain different modes in Serial Peripheral Interface (SPI)
- 3.3.0 Discuss about built in USART
 - 3.3.1 Explain Transmit mode
 - 3.3.2 Explain Receiver Mode
 - 3.3.3 Mention various registers in connection with USART
- 3.4.0 Discuss about Analog to Digital converter
- 3.5.0 Discuss other special features
 - 3.5.1 Configuration Word
 - 3.5.2 Oscillator types
 - 3.5.3 Reset Types
 - 3.5.4 Interrupts
 - 3.5.5 Watch Dog Timer
 - 3.5.6 Power Down or SLEEP Mode
 - 3.5.7 Serial Programming

UNIT – IV

Introduction to Embedded System

- 4.1.0 Define an embedded System
 - 4.1.1 Discuss about different application area
 - 4.1.2 Mention different categories of embedded systems, like Stand alone, Real Time, Networked and Mobile
- 4.2.0 Know the specialties of an Embedded System compared to desktop, workstations and mainframes
 - 4.2.1 Reliability
 - 4.2.2 Performance
 - 4.2.3 Power Consumption
 - 4.2.4 Cost
 - 4.2.5 Size
 - 4.2.6 Limited User Interface
 - 4.2.7 Software Up-gradation capability
 - 4.2.8 Processor Power
 - 4.2.9 Memory
 - 4.2.10 Operating Systems
 - 4.2.11 Communication capabilities / Network capabilities
- 4.3.0 Discuss a general architecture of an embedded system – block diagram
- 4.4.0 Discuss different Hardware development Platforms
 - 4.4.1 Explain 89C51 Based Development Board
 - 4.4.1.1 Features
 - 4.4.1.2 Hardware description (Block Diagram)
 - 4.4.1.3 Different components

- 4.4.2 Explain AVR ATmega 128 Microcontroller based Development Board
 - 4.4.2.1 Features
 - 4.4.2.2 Hardware Description
 - 4.4.2.3 Description of AVR ATmega 128 Microcontroller
 - 4.4.2.4 Components
- 4.4.3 Explain Intel StrongARM microprocessor based development Board
 - 4.4.3.1 Features of StrongARM Processor
 - 4.4.3.2 Discuss Prayog
 - 4.4.3.3 Features of Prayog, Block diagram and Components
 - 4.4.3.4 Applications on ARM platform

UNIT – V

Architecture of an Embedded Operating System

- 5.1.0 Different activities of embedded system operating system
 - 5.1.1 Discuss various activities of an embedded OS like , Task, Task Scheduling , Context Switching , Mutual Exclusions, Inter task communications, Memory Management and Timer services (Brief explanations only)
- 5.2.0 Embedded System OS architecture
 - 5.2.1 Discuss a general architecture of an embedded OS
 - 5.2.2 Discuss the role of Kernel in embedded OS
 - 5.2.3 Explain how Device Manager interface different applications with hardware
 - 5.2.4 Discuss the duties of Network Communication Software in an embedded OS
 - 5.2.5 Discuss about library and its use in an embedded OS
 - 5.2.6 Discuss about file systems in an embedded OS
- 5.3.0 Introduce different categories of embedded OS and give examples for each
 - 5.3.1 Non-Real Time OS
 - 5.3.2 Real-Time OS
 - 5.3.3 Mobile/Handheld OS

CONTENT DETAILS

UNIT – I

Introduction to PIC, Features, Compare 16C 6X / 7X family members – Architecture of PIC 16F74A – Block Diagram – Features of 16F74A – Pin configuration – Memory Organization – Program Memory – Data Memory – Define SFR – CPU Registers

UNIT – II

Addressing modes – Direct Addressing – Indirect Addressing – Instruction Set – Byte Oriented – Bit Oriented – Literal and Control Instructions – Arithmetic – Logical – Increment/decrement – Data transfer – Clear instructions – Rotate instructions – Branch (Conditional & unconditional) – and Miscellaneous Instructions – Simple programs

UNIT – III

Built in advanced features of 16C 6X / 7X PIC – Timers – Features of Timer 0– Timer 1 and Timer2 – Timer1-Compare mode-Capture Mode – Timer2-PWM Mode
 Synchronous Serial Port (SSP) – Modes in SSP module-Serial Peripheral Interface (SPI) and Inter Integrated Circuit (IIC) – SPI module modes
 USART – Transmitter mode – Receiver mode – Registers
 Analog to Digital Converter – Features – Special feature – Configuration word – Oscillator configuration – Reset types – Interrupts – Watch Dog Timer – Power Down Mode and In – Circuit Serial Programming

UNIT – IV

Introduction to Embedded systems – Application Areas – Categories of embedded systems – Specialties of Embedded Systems – Architecture of Embedded System (Block Diagram)

Hardware Platforms: Types of Hardware Platforms – Single Board Computers, PC add-on Cards and Custom-Built Platforms

Custom-Built Platforms –

89c51 microcontroller based development board – Feature of 89c51 – Development board Features – Hardware Description and Components

AtmelAVR ATmega128 microcontroller based development board–Feature of AVR ATmega128 – Development board Features – Hardware Description and Components

Intel StrongARM processor based development board–Feature of StrongARM – Development board - PRAYOG– PRAYOG block diagram – components applications on ARM Platforms

UNIT – V

Architecture of Embedded Operating System – Activities of embedded OS – Tasks – Task Scheduling – Context Switching – Mutual Exclusion – Inter Task Communications – Memory Management – Timer Services

Embedded OS – block diagram–Embedded OS Parts – Kernal – Device Manager – Networking Protocol Software – Libraries and File Systems

Categories of Embedded System OS – Non Real Time OS – Real Time OS – Mobile and Hand held OS – Examples for each category

SUBJECT TITLE : COMPUTER & PERIPHERALS TROUBLESHOOTING
SUBJECT CODE : CM 502
PERIODS/WEEK : 6
PERIODS/SEMESTER: 96

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	Power supply & Display	18
II	Organisation of motherboards	18
	Test – I	2
III	Secondary memory	18
IV	I/O devices	18
	Test – II	2
V	Systems setup & Trouble shooting	18
	Test – III	2
	Total	96

OBJECTIVES

UNIT – I

1.1.0 Understand Power supply and Display adapters

- 1.1.1 Draw the block diagram of an SMPS and explain its working
- 1.1.2 List the voltage signals from an SMPS
- 1.1.3 State the need for power good signal
- 1.1.4 Discuss the power requirements for the components in a PC
- 1.1.5 Identify the power connectors for various components in a PC
- 1.1.6 Explain the features of AT, ATX and NLX, SMPS illustrating the power supply connectors
- 1.1.7 Describe the alphanumeric character generation system
- 1.1.8 Define the display adapter/display controller
- 1.1.9 Know pixels, resolution, dot pitch, horizontal frequency, vertical frequency
- 1.1.10 List the different types of display adapters
- 1.1.11 Compare the display adapters – MDA, CGA, HGA, EGA, VGA, SVGA on the basis of color, mode, and RAM capability. RAM address, resolution, dot pitch, horizontal frequency etc.
- 1.1.12 Draw the pin outs of various display adapters
- 1.1.13 Compare Raster scan and vector scan displays
- 1.1.14 Distinguish between interlaced and non-interlaced displays
- 1.1.15 Draw the block diagram of a VGA monitor and explain
- 1.1.16 Describe AGP
- 1.1.17 List the advantages of AGP
- 1.1.18 Study of display controllers MC 6845 & IC 8514

UNIT – II

2.1.0 Understand Motherboard organization

- 2.1.1 Draw the PC, PC/AT , ATX motherboard organization
- 2.1.2 Explanation of Motherboard components
- 2.1.3 List the different form factors

- 2.1.4 Explain the different form factors – AT, Baby AT, LPX, ATX, MicroATX, FlexATX, NLX with dimensions
- 2.1.5 Differentiate between Integrated design and non-integrated design
- 2.1.6 Discuss the Microprocessors based on years of design, coprocessors, speed, address lines, data lines, address space, main CPU registers and manufacturers
- 2.1.7 State the need for coprocessor with examples
- 2.1.8 State the need for Numeric processor with examples
- 2.1.9 Explain RAM, DRAM, SRAM, SDRAM, DDRAM, RDRAM
- 2.1.10 Define Memory Refreshing
- 2.1.11 Define SIMM and DIMM, RIMM
- 2.1.12 Explain briefly the memory mapping
- 2.1.13 Describe the Base Memory, Extended memory & upper Memory area, Expanded memory
- 2.1.14 Explain Cache memory- L1 Cache and L2 Cache
- 2.1.15 Discuss the chipsets and support chips, CMOS chip- CMOS Setup
- 2.1.16 Explain North Bridge and South Bridge
- 2.1.17 Discuss expansion cards – I/O card, Graphics Card, Sound card, Network Interface card, Internal Modem etc
- 2.1.18 Study of ROM – PROM, EPROM, EEPROM, EAPROM, Firmware
- 2.1.19 Describe the Various Connectors on the Motherboard

UNIT – III

3.1.0 Understand Secondary Storage devices

- 3.1.1 Understand magnetic storage devices
- 3.1.2 Discuss recording techniques, FM, MFM, RLL, EFM et
- 3.1.3 Discuss FAT, Boot sector, directory area, data area
- 3.1.4 Discuss various file systems FAT16, FAT32, New Technology File System(NTFS), High Performance File System(HPFS), Linux File System (only Hardware view)
- 3.1.5 Study the physical structure of floppy disk
- 3.1.6 Know the terms track, sector, cluster, cylinder
- 3.1.7 Describe the floppy disk drives with the help of a block diagram
- 3.1.8 Describe the FDC organization
- 3.1.9 Define sector interleaving
- 3.1.10 State the need for write pre compensation
- 3.1.11 Hard disk
- 3.1.12 Describe the construction of a hard disk
- 3.1.13 Define Seek time, Latency time
- 3.1.14 Explain the different HDD interfaces ST506, IDE, ESDI and SCSI, SATA
- 3.1.15 Describe the Hard Disk controller
- 3.1.16 Explain low level formatting
- 3.1.17 List the different tools for low level formatting
- 3.1.18 Explain Partitioning of Disk
- 3.1.19 State the need for partitioning
- 3.1.20 List the tools for partitioning
- 3.1.21 Discuss the various procedures for disk partitioning
- 3.1.22 Explain high level formatting
- 3.1.23 List the tools for high level formatting
- 3.1.24 Discuss the Optical Recording Techniques
- 3.1.25 Describe the constructional details of Compact Disk
- 3.1.26 Discuss the trends in optical media – CDROM, CD-R, CD-RW
- 3.1.27 Discuss the access time of CD – the X-factor
- 3.1.28 Explain the recording principle on CDs
- 3.1.29 List the CD-ROM manufacturing standards
- 3.1.30 Compare CD and DVD
- 3.1.31 Explain characteristics of DVD
- 3.1.32 Discuss the DVD technologies – DVD-RAM, DVD-R, DVD-RW, DVD+RW etc.

- 3.1.33 Discuss the DVD standards
- 3.1.34 Discuss USB Drives – pendrive, pocket harddrive

UNIT – IV

4.1.0 Understand keyboard organizations and mouse

- 4.1.1 Define key debouncing, typematic rate, encoding, make code and break code
- 4.1.2 Describe the matrix keyboard organization
- 4.1.3 Explain the method of encoding a keypress
- 4.1.4 Discuss the keyboard controllers
- 4.1.5 State the methods of interfacing of keyboards to system unit
- 4.1.6 Discuss the various types of key switches
- 4.1.7 List their advantages and disadvantages of various key switches
- 4.1.8 Draw the typical keyboard connectors – 5 pin DIN, mini DIN (ps/2), USB
- 4.1.9 Describe the construction of mouse- mechanical mouse, optoelectronic mouse, optical mouse
- 4.1.10 Interfacing of mouse – mouse connectors – serial, PS/2, Bus mouse, USB, wireless
- 4.1.11 Discuss trackball
- 4.1.12 Discuss other input devices light pen, joystick and graphic tablets
- 4.1.13 Know the use of scanner
- 4.1.14 Explain briefly the working of flat-bed and hand held scanners
- 4.1.15 Discuss Negative scanner
- 4.1.16 Discuss the different classification of printers
- 4.1.17 Distinguish between impact and non-impact printer
- 4.1.18 Describe the different types of printers – Dot matrix, daisy wheel, inkjet, laser, thermal printers, line printer
- 4.1.19 Explain the working of a dot-matrix printer
- 4.1.20 Explain the working of an inkjet printers
- 4.1.21 Explain the working of a laser printer
- 4.1.22 Describe the centronics Interface, USB interface
- 4.1.23 Draw the printer controller organization and explain

UNIT – V

5.1.0 Understand the troubleshooting methods

- 5.1.1 Explain planning procedure, Routine checking
- 5.1.2 Explain System assembling procedure
- 5.1.3 Explain the components of a multimedia system
- 5.1.4 List the step by step procedure of installing multimedia
- 5.1.5 List the components of internet ready system
- 5.1.6 List the step by step procedure of installing internet
- 5.1.7 Describe preventive maintenance
- 5.1.8 State the need for UPS
- 5.1.9 Study different types of UPS – online and offline
- 5.1.10 Discuss viruses-vaccine, type, preventing, testing
- 5.1.11 Study data recovery tools
- 5.1.12 State the safety precaution to be adopted in troubleshooting
- 5.1.13 Discuss troubleshooting methods- computer faults- network faults, type
- 5.1.14 Study troubleshooting tools – CRO, logic probe, logic pulsar, in circuit emulator, logic analyzer
- 5.1.15 Study faults with firmware- elimination process
- 5.1.16 List the error codes and beep codes
- 5.1.17 Describe the post sequences
- 5.1.18 Discuss about diagnostic software
- 5.1.19 Discuss bench marking techniques

CONTENT OUTLINE

UNIT – I

SMPS – ATX/NLX Power Supply – display adapter – alphanumeric character generation system – MDA – CGA, HGA, EGA, VGA, SVGA - Pin outs – VGA monitor block diagram – AGP – MC 6845, IC 8514

UNIT – II

Organisation of motherboard – form factors – AT, ATX motherboards – different sections of motherboards – Intel microprocessor – Comparison – co-processor – numeric processor – RAM, DRAM – SRAM – Refreshing – SIMM, DIMM, memory mapping – conventional memory, upper memory, Extended memory, expanded memory – chipsets – Bus mastering – ISA, EISA, VESA, PCI, PCM CIA, USB architecture

UNIT – III

Magnetic recording techniques – FM, MFM, RLL, EFM, Floppy disk – FAT, Beet area – Directory area, data area – floppy drive – FDC – Sector interleaving – write pre-compensation – Hard disk – construction – low level and high level formatting – HDD interfaces – HDC – optical recording techniques – CD – CD recording – DVD

UNIT – IV

Keyboard – organization – matrix – keyboard controllers – interfacing of keyboard – key switches – keyboard connectors – PS/2 connector – mouse – working principles – mechanical mouse – opto electronic mouse, optical mouse – light pen – joystick – tablets – scanner, pointer – types – dot-matrix – inkjet, laser printers – centronics – interface – printer controller

UNIT - V

System assembling procedure-procedure of installing internet - preventive maintenance-UPS - viruses-data recovery tools - safety precautions - troubleshooting tools - faults with firmware- error codes – beep codes- post sequences - diagnostic software - bench marking techniques

REFERENCE BOOKS

1. Troubleshooting, maintaining & repairing PCs – Stephen.J.Bigelaw
2. IBM PC clones – B.Govinda Rajulu
3. Upgrading and repairing PCs – Scott Muller
4. Modern All about Series – Manohar Lotia BPB- Publications

SUBJECT TITLE : NETWORK PROGRAMMING
SUBJECT CODE : CM503/CT503
HOURS/WEEK : 6
HOURS/SEMESTER : 96

TIME SCHEDULE

UNIT	TOPIC	PERIODS
1	Streams	18
2	Sockets	18
	Test	02
3	Remote Method Invocation (RMI)	18
4	Threads	18
	Test	02
5	Naming Services & RMI Runtime	18
	Test	02
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Total		96

Objectives

UNIT I

- 1 **JAVA Programming**
 - 1.1 Revise Java Servlets and Applets
 - 1.2 Revise Java Virtual Machine
 - 1.3 Discuss AWT controls
 - 1.4 Discuss Event Handling
 - 1.5 Distinguish between console programs and window (GUI) programs.
 - 1.6 Discuss Java Beans and Java Swing

UNIT II

1. **Understand Streams**
 - 1.1 Understand Input Stream: Reading Data, Stream navigation
 - 1.2 Understand IOException
 - 1.3 Understand Output Stream: Writing Data, Resource management
 - 1.4 Implement Viewing a File (program)
 - 1.5 Understand Layering Streams
 - 1.6 Implement Compressing a File (program)
 - 1.7 Streams, Reusability, and Testing
 - 1.8 Understand DataInputStream and DataOutputStream.

UNIT III

3. **Sockets**
 - 3.1 Study Sockets
 - 3.2 Study socket programming concepts
 - 3.3 Implement Creating a Socket (Program)
 - 3.4 Study protocols and Meta data
 - 3.5 Implement Server Sockets
 - 3.6 Customizing Socket behavior
 - 3.7 Special purpose Sockets
 - 3.8 Implement Direct Stream Manipulation
 - 3.9 Understand Subclassing Sockets

- 3.10 Implement special purpose Sockets
- 3.11 Understand Secured Socket Layer (SSL)
- 3.12 Implement Socket Based Printer Server
- 3.13 Understand Spooling

UNIT IV

4. Remote Method Invocation (RMI)

- 4.1 Understand Basic Structure of RMI
- 4.2 Study Serialization
- 4.3 Implement basic objects of RMI
- 4.4 Implement a client application using RMI
- 4.5 Understand Client Side Caching
- 4.6 Design Remote Interface
- 4.7 Understand Common Object Request Broker Architecture (CORBA)

UNIT V

5. Threads

- 5.1 Understand concept of multiple clients
- 5.2 Study basic terminology – Calling stack, Heap, Threads, Mutex
- 5.3 Study Threading Concepts
- 5.4 Study Thread programming concepts
- 5.5 Understand Controlling Individual Threads
- 5.6 Understand Coordinating Thread Activities
- 5.7 Understand Cache Management
- 5.8 Assigning priorities to Threads
- 5.9 Study support for Threads in Java
- 5.10 Study Thread manipulation methods defined on Object
- 5.11 Understand Threading and RMI
- 5.12 Implement Threading
- 5.13 Study guidelines for Threading
- 5.14 Understand Using Container Classes
- 5.15 Understand Inter-thread Communication
- 5.16 Study Creation Thread

Content Outline

UNIT I- Java Programming

Servlets and Applets- Java Virtual Machine AWT controls, Event Handling , console programs and window (GUI) programs. Java Beans and Java Swing.

UNIT II Streams

Streams-Input Stream , IOException, Output Stream , Layering Streams, Streams, Reusability, and Testing, DataInputStream and DataOutputStream

UNIT III- Sockets

Sockets- Creating a Socket, protocols and Meta data, Server Sockets, Customizing Socket behavior, Special purpose Sockets, Direct Stream Manipulation, Subclassing Sockets, Special purpose Sockets, Secured Socket Layer (SSL), Socket Based Printer Server, Spooling

UNIT IV- Remote Method Invocation (RMI)

Remote Method Invocation (RMI) - Basic Structure of RMI, Serialization, Basic objects of RMI, Client Side Caching, Remote Interface, Common Object Request Broker Architecture (CORBA)

UNIT V - Threads

Threads- concept of multiple clients, basic terminology, Threading Concepts, Controlling Individual Threads, Coordinating Thread Activities, Cache Management, Assigning priorities to Threads, support for Threads in Java, Thread manipulation methods defined on Object, Threading and RMI, guidelines for Threading, Container Classes, Inter-thread Communication, Creation Thread

Reference Book :

1. JAVA RMI by William Grosso : O'REILLY publications Indian Reprint
by SHROFF publishers and Distributors Pvt. Ltd.
2. Java Network Programming by Elliotte Rusty Harold
3. Java Network Programming by Hughes Et Al

SUBJECT TITLE : ADVANCED MICROPROCESSORS
SUBJECT CODE : CM504/CT504
PERIODS/WEEK : 5
PERIODS/SEMESTER : 80

TIME SCHEDULE

<u>UNIT</u>	<u>TOPIC</u>	<u>PERIODS</u>
I	16 bit Microprocessors	14
II	ALP Concepts	15
	Test - I	2
III	Advanced Programming	15
IV	Computer Architecture	15
	Test - II	2
V	Advanced Architectures	15
	Test - III	2
	Total	80

OBJECTIVES

UNIT – I

1.1.0 Know about 16/32 Bit Microprocessors

- 1.1.1 State the limitations of a 8 bit microprocessors
- 1.1.2 State the need for 16/32 Microprocessors
- 1.1.3 State the need for compatibility

1.2.0 Understand the Architecture of 8086 Microprocessor

- 1.2.1 Draw the register structure diagram 8086 processor
- 1.2.2 State the need for group register
- 1.2.3 State the need for index register
- 1.2.4 State the need for segment register
- 1.2.5 Give the steps involved in computing the physical address
- 1.2.6 Draw the pin diagram g 8086
- 1.2.7 Draw the block diagram of a typical system bus architecture
- 1.2.8 Distinguish maximum and minimum mode of operation of 8086
- 1.2.9 Give the system bus timing
- 1.2.10 State the internal operations of CPU
- 1.2.11 Illustrate the different addressing modes in 8086
- 1.2.12 Illustrate the different instruction formats (1 to 6 bytes)
- 1.2.13 Compute the execution time for simple instructions
- 1.2.14 State the capability of 8088 and 8086

UNIT – II

2.1.0 Understand the Assembly level programming on 8086

- 2.1.1 Know the assembly instruction format
- 2.1.2 Explain State the different data transfer instructions
- 2.1.3 Explain the different arithmetic instructions
- 2.1.4 Explain the different loop instruction
- 2.1.5 Explain the different type data conversion instruction
- 2.1.6 Explain branch instructions
- 2.1.7 Explain shift and rotate instructions
- 2.1.8 Explain compare instructions
- 2.1.9 Understanding different type assemblers
- 2.1.10 State assembler directives and operatives
- 2.1.11 Understanding of DEBUG command

- 2.1.12 Understanding of BIOS interrupts
- 2.1.13 Understanding of DOS interrupts
- 2.1.14 Write simple assembler programs using above instructions
- 2.1.15 State the interrupt structure of 8086

UNIT III

3.1.0 Implementing advanced programs

- 3.1.1 Write Program for clear the screen
- 3.1.2 Write program to echo type character
- 3.1.3 Write program display all the characters
- 3.1.4 Write program for data transfer type
- 3.1.5 Write program for string processing type
- 3.1.6 Write program for converting a string to BOLD format
- 3.1.7 Write program for converting HEX to BCD conversion
- 3.1.8 Write program for String comparison
- 3.1.9 Write program for string reverse
- 3.1.10 Write program for solving problems like LCM, GCD
- 3.1.11 Write program for displaying system clock
- 3.1.12 Write program for drawing figures like triangle
- 3.1.13 Write program for file creation, file processing , etc
- 3.1.14 Write program for largest of an array
- 3.1.15 Write program for binary to gray
- 3.1.16 Write program for decimal multiplication
- 3.1.17 Write program for sorting decimal numbers
- 3.1.18 Write program for case conversion of string
- 3.1.19 Write program for password checking
- 3.1.20 Write program for check palindrome
- 3.1.21 Write program for string search
- 3.1.22 Write program for printing
- 3.1.23 Write program for generating random numbers
- 3.1.24 Write program for sum of arithmetic progression
- 3.1.25 Write program for positioning the cursor

UNIT IV

4.1.0 Understand the control unit and micro operations

- 4.1.1 Define instruction sequencing and instruction interpretation
- 4.1.2 Define micro instructions
- 4.1.3 Describe instruction execution sequencing
- 4.1.4 Explain about the different cycles (Fetch cycle, indirect cycle, interrupt cycle, execute cycle)
- 4.1.5 Explain briefly about hardwired implementation of control unit
- 4.1.6 Explain about control unit logic
- 4.1.7 Give the micro instruction format
- 4.1.8 Explain about micro programmed control unit
- 4.1.9 Explain the micro instructions sequence
- 4.1.10 Give details design, sequencing, and address generations
- 4.1.11 Explain briefly about micro instruction execution
- 4.1.12 Explain the taxonomy, encoding, and execution

4.2.0 Understand parallel

- 4.2.1 Define parallel processing
- 4.2.2 List the different types of parallel processing
- 4.2.3 Define bandwidth
- 4.2.4 Define flops
- 4.2.5 Explain about symmetric multi processors (SMP)
- 4.2.6 Explain about multi processing operating systems

- 4.2.7 Explain briefly about SISD, SIMD, MISD, MIMD organization processors
- 4.2.8 Explain briefly about the pipeline processor
- 4.2.9 Distinguish between instruction pipelining and arithmetic pipelining
- 4.2.10 Explain briefly about pipeline scheduling
- 4.2.11 Explain about clustering
- 4.2.12 Explain the benefits
- 4.2.13 Differentiate clusters and AMP

UNIT V

5.1.0 Advanced processors

- 5.1.1 Advanced processor. – 32 bit/64 bit processors
- 5.1.2 Concepts of RISC & CISC
- 5.1.3 Distinguish between RISC & CISC
- 5.1.4 Concepts of vector processing
- 5.1.5 Super Scalar Architecture
- 5.1.6 Advantages of Superscalar Architectures

5.2.0 Case study : Pentium processors

- 5.2.1 Draw and explain internal architecture of Pentium
- 5.2.2 Explain the functions of registers and flags
- 5.2.3 Describe Pentium bus structure
- 5.2.4 Classify instruction set
- 5.2.5 Discuss how interfacing is implemented using Pentium
- 5.2.6 State maximum interfacing capacity of Pentium
- 5.2.7 Discuss various Pentium chips and their architecture and features
- 5.2.8 Compare the capabilities of the above

5.3.0 Discuss various modern processors

- 5.3.1 Understanding the concepts of Hyper threading
- 5.3.2 Understanding multicore processors

CONTENT DETAILS

UNIT – I

Need for 16/32 bit microprocessors – Architecture of 8086 microprocessor – study of group register – index register, segment register – bus architecture – bus timings – addressing modes – instruction formats

UNIT – II

Instruction format – data transfer instructions – arithmetic instruction – loop instructions – flag instructions – shift and rotate instructions – assembler directives and operatives – Assembler directives, TASM & TLINK, DOS int routines, writing program – Interrupt structure of 8086

UNIT – III

Advance programming concepts in 8086. - Programs for : clear the screen, display all the characters, data transfer type, string processing type, string to BOLD format, HEX to BCD conversion, String proc, data conversion, LCM, GCD, system clock, Draw a triangle, file creation, file processing , etc

UNIT IV.

Computer Architecture, - Organization of Control unit., Micro instructions – Micro programs- Microprogrammed control unit-Parallel processing - SISD, SIMD, MISD, MIMD, pipe lining, m unit processor

UNIT V

Advanced processor : RISC, CISC, vector processor, Superscalar architecture

Case Study : Pentium processor –architecture, registers and instruction set. – interfacing

Modern processors – hyper threading- multicore processing

References :

1. Microprocessors – Bray
2. Microprocessors and Interfacing – Douglas V Hall
3. Assembly Language Programming – VenuGopal
4. Assembly Language Programming – Abel
5. Microprocessors & Microcontrollers – Thiagarajan (SCITECH)

SUBJECT TITLE : HARDWARE LAB – IV (EMBEDDED SYSTEMS)
SUBJECT CODE : CM505
PERIODS/WEEK : 3
PERIODS/SEMESTER : 48

CONTENT DETAILS

PIC Programming

1. Familiarization of PIC development Kit
2. Addition of two 8 bit data
3. Subtraction of two 8 bit data
4. Multiplication of two 8 bit data
5. Block transfer of data
6. Programs that makes the processor into SLEEP mode
7. Programs that includes Watch Dog Timer programming
8. Counter programs using Timer
9. PWM using Timer 2
10. Programs for communicating with other microprocessors using Synchronous Serial port
11. Programs for communicating with an external ADC
12. Serial transmit type programs using in built USART

SUBJECT TITLE : SOFTWARE LAB – III (Operating Systems)
SUBJECT CODE : CM506
PERIODS/WEEK : 3
PERIODS/SEMESTER : 48

LIST OF EXERCISES

1. a) Display messages using 'echo' command
- b) Identify the terminal with 'who' command
- c) Getting help of various commands using 'man' command
- d) List the process status using 'ps' command
- e) Assigning values for shell variables using 'set' command
2. Adding an user to the system using system administration function
 - Removing an user from the system using system administration
 - Setting password for users
 - Searching files with find command
 - 'Shutdown' command
3. Use 'sort' command for sorting text files
 - Know 'grep' command
 - Know 'sed' stream editor
 - Use 'cut' and 'paste' command
4. Use editor 'vi' and its options
 - Use 'ex' and its options
5. Know script. Sh., env, exit
 - Use the 'if', 'then', 'else' statement
 - Use the 'case' statement
 - Use the 'expr' command
 - Use the 'while' statement
 - Use the 'for' command
6. Write a script or shell program that accepts one or more file name as arguments and converts them all to uppercase
7. Write a script that accepts a file name as argument and displays the last modification time if the file exists and a suitable message if it does not
8. Installation and configuration of Linux
9. Installing and upgrading software packages
10. Creating users and groups
11. Perform Network configuration
12. Configure a) DNS b) Apache server c)FTP d) Samba server
13. Implement telnet service
14. Implement NIS & NFS services
15. Configure SMTP, POP3

SUBJECT TITLE : SOFTWARE LAB IV (Visual Basic)
SUBJECT CODE : CT 507
PERIODS/WEEK : 3
PERIODS/SEMESTER: 48

LIST OF EXERCISES

1. Experiments using textbox, label, command button, graphic control
5. Experiments using combobox, checkbox, radio buttons, option button controls
6. Experiments for MDI forms and create menu to call child forms
7. Experiments using control structures like if statements, loops and arrays
8. Experiments using functions and procedures
9. Experiments with common dialog controls
10. Experiments for file organization: sequential and random
11. Experiments using file controls: file list, dir list, drive list controls
12. Experiments for Activex controls
13. Experiments for creating database applications with ADO controls
 - a) Inserting data
 - b) Finding data
 - c) Displaying data using flexgrid control
 - d) Updating data

SUBJECT OF STUDY AND SCHEME OF EVALUATION

BRANCH: COMPUTER HARDWARE MAINTENANCE

Semester 6

Code	Subject	Periods Per Week			Evaluation (Marks)			
		Theory	Practical/ Tutorial	Total	Theory	Practical	Internal	Total
GE 601	Industrial Management	5	1	6	75		25	100
CM 602	Information Security	5	1	6	75		25	100
CM 603/ CT 603/ IF 603	Mobile Computing	5	0	5	75		25	100
CM604	Hardware Lab –V (Computer Hardware & Networking)		6	6		75	25	100
CM605	Hardware Lab – VI (Assembly Language Programming)		3	3		75	25	100
CM606	Software Lab – V (Network Programming)		3	3		75	25	100
CM607	Project		3	3		50	25	100
	Seminar		3	3			25	
	TOTAL	15	20	35	225	275	200	700

SUBJECT TITLE : INDUSTRIAL MANAGEMENT & ENTREPRENEURSHIP
SUBJECT CODE : GE 601 (COMMON TO ALL)
PERIODS/WEEK : 5 + 1 Tutorial
PERIODS/ SEMESTER : 80 + 16

TIME SCHEDULE

UNIT	TOPIC	PERIODS
I	1.1 Principles of Management	10
	1.2 Human Resource Management	5
II	2.1 Quality Planning and Control	5
	2.2 ISO-9000 & Installation	5
	2.3 TQM and Organizational Excellence	5
	Test – I	2
III	3.1 Project Management PERT / CPM	6
	3.2 Marketing & Sales	2
	3.3 Wages & Incentives	4
	3.4 Material Requirement Planning (MRP)	3
IV	4.2 Operations Research and Applications	10
	4.3 Management by Objectives (MBO)	3
	4.4 Management Information System (MIS)	2
	Test – II	2
V	5.1 Industrial Psychology	3
	5.2 Entrepreneurship Development	4
	5.3 Industrial Safety	4
	5.4 Environmental Pollution & Control	4
	Test – III	1
Total		----- 80 + 16

OBJECTIVES

UNIT – I

1.1.0

Understand the Principle of Management

- 1.1.1 Explain the meaning and concepts of management
- 1.1.2 Outline the characteristics of management
- 1.1.3 Illustrate the development of management theory
- 1.1.4 Illustrate the Taylor’s scientific management and contributions
- 1.1.5 Illustrate Henry Fayol’s principles of management
- 1.1.6 Compare the contributions of Taylor and Fayol
- 1.1.7 State the functions of management
- 1.1.8 Explain various administrative steps of each function
- 1.1.9 Describe different types of ownership
- 1.1.10 Explain different types of organization structure
- 1.1.11 Explain the concept of Leadership, Motivation & communication.

1.2.0 Appreciate the functions of Human Resource Management

- 1.2.1 Outline the importance of HRD
- 1.2.2 Explain the process of man power planning
- 1.2.3 Explain Job analysis, job evaluation, merit rating, performance appraisal
- 1.2.4 Training & Methods of Training

UNIT – II

2.1.0 Understand quality planning & control

- 2.1.1 Define quality
- 2.1.2 List the dimensions of quality
- 2.1.3 List the objectives of quality planning
- 2.1.4 Describe various quality control measures in brief
- 2.1.5 Explain quality assurance concept and definition
- 2.1.6 Describe in brief the Three Prong Approach to Quality Planning
- 2.1.7 Explain the need for quality management system
- 2.1.8 Draw quality loop

2.2.0 Understand the elements of ISO 9000, its Installation and audit

- 2.2.1 Describe the concept and role of ISO 9000
- 2.2.2 List the elements of ISO 9000
- 2.2.3 List the steps for installing quality system
- 2.2.4 Explain different ways of quality audit
- 2.2.5 Identify the agencies who give ISO certification
- 2.2.6 Discuss the role of accreditation board
- 2.2.7 Explain various stages of ISO 9000 implementation
- 2.2.8 Describe briefly the benefits of becoming an ISO 9000 company

2.3.0 Understand the concept of TQM and Organizational Excellence

- 2.3.1 Explain the concept of TQM
- 2.3.2 Outline the ten “Manthras” of TQM
- 2.3.3 Discuss in brief the link between ISO 9000 and TQM with TQM model
- 2.3.4 Draw the organizational structure of TQM
- 2.3.5 Explain the different techniques of TQM
- 2.3.6 Discuss the concepts and characteristics of Quality Circle
- 2.3.7 Discuss the brain storming technique used in quality circle for arriving at solutions
- 2.3.8 Explain the organizational excellence by TQM approach and through “SWOT” analysis
- 2.3.9 Write mission statement

UNIT – III

3.1.0 Apply the principles of CPM & PERT

- 3.1.1 Outline the network technique
- 3.1.2 List different applications of CPM & PERT
- 3.1.3 Out line scope of PERT & CPM
- 3.1.4 Define the terms used in CPM & PERT
- 3.1.5 Explain the procedure for finding the critical path
- 3.1.6 Compute the project duration, slack and critical path by using AON &AOA
- 3.1.7 Distinguish between CPM & PERT
- 3.1.8 Define the terms used in PERT
- 3.1.9 Explain the procedure for pert
- 3.1.10 Estimate activity time
- 3.1.11 Compute the project duration slack and mark the critical path
- 3.1.12 Solve the problems in PERT & CPM

3.2.0 Understand various steps in Marketing & Sales planning

- 3.2.1 Define marketing
- 3.2.2 List the objectives of marketing
- 3.2.3 Outline the core marketing concepts with the help of block diagrams
- 3.2.4 Discuss in brief the marketing mix, buying process and behaviour
- 3.2.5 Outline the importance of sales of products and services

- 3.2.6 List the functions of sales department
- 3.2.7 Explain the steps in market planning, market segmentation
- 3.2.8 Discuss the importance and functions of sales management
- 3.2.9 Discuss sales planning
- 3.2.10 Explain the market research and market information system
- 3.3.0 Understand the Principles of a good Wage Payment System**
 - 3.3.1 Outline the importance of a good wage plan
 - 3.3.2 Define the different types of wages
 - 3.3.3 List the requirements of a good wage plan
 - 3.3.4 Define Incentives
 - 3.3.5 Identify financial, non financial and semi financial incentives
 - 3.3.6 Discuss different types of financial incentives plan
 - 3.3.7 Compute the wages under different incentive plans with examples
 - 3.3.8 Understand the concept of MRP
 - 3.3.9 Understand the application of MRP

UNIT – IV

- 4.1.0 Understand various methods in Operations Research and its application**
 - 4.1.1 Outline the concept of optimization
 - 4.1.2 Outline the scope of O.R
 - 4.1.3 List the phases and processes of O.R
 - 4.1.4 List the different methods of O.R.
 - 4.1.5 Explain Linear programming graphical method & analytical method
 - 4.1.6 Compute maximization of profit by linear programming - graphical method and analytical method (simple problems only)
 - 4.1.7 Compute minimization of total cost by Linear programming - graphical method and analytical method (simple problems only)
 - 4.1.8 Explain the transportation problem
 - 4.1.9 Compute the initial feasible solution by north west corner rule and Vogel approximation method (simple problems only)
 - 4.1.10 Explain the game theory
 - 4.1.11 Compute the saddle point of the game two – person – zero sum using maximize and minimize principle (simple problems only)
 - 4.1.12 Explain the queuing theory
 - 4.1.13 List information required for formulating a mathematical model
- 4.2.0 Understand the concept of Management By Objective (MBO)**
 - 4.2.1 Outline the nature and purpose of MBO
 - 4.2.2 Identify sequential MBO processes
 - 4.2.3 List the merits and demerits of MBO
 - 4.2.4 List the steps required for MBO
 - 4.3.5 List the guidelines for setting objectives for MBO
- 4.3.0 Appreciate Management Information System (MIS)**
 - 4.3.1 Define MIS
 - 4.3.2 Distinguish between data and information, data processing & MIS
 - 4.3.3 State the need for information
 - 4.3.4 Discuss the systems concept of management
 - 4.3.5 Discuss a firm and its environment
 - 4.3.6 List the objectives and inputs of an effective MIS
 - 4.3.7 Explain the integrated MIS
 - 4.3.8 List major functional and activity subsystems in MIS
 - 4.3.9 Describe MIS development (system development) with the help of a line diagram
 - 4.4.10 List applications of MIS

UNIT – V

5.1.0 Justify the concept of Industrial Psychology

- 5.1.1 Describe the meaning of Industrial Psychology
- 5.1.2 Outline the importance of good working conditions and environment
- 5.1.3 Explain the concept of Behavioural dynamics
- 5.1.4 Distinguish the interpersonal behaviour and interpersonal needs
- 5.1.5 Discuss the development of interpersonal relationship
- 5.1.6 Describe the development of better qualities (personality traits)

5.2.0 Formulate the feasible project report to start a small scale industry

- 5.2.1 Explain the concept of entrepreneurship
- 5.2.2 Describe the profile of an entrepreneur
- 5.2.3 List the functions of an entrepreneur
- 5.2.4 List the risk taking qualities of an entrepreneur
- 5.2.5 Explain the concept of entrepreneurial development
- 5.2.6 List the different factors contributing to the failure of entrepreneurial ventures
- 5.2.7 Identify industrial support needed programs existing in India
- 5.2.8 State the concept of small scale and ancillary industrial undertaking
- 5.2.9 List the steps involved in starting small-scale industry
- 5.2.10 Describe the procedure of registration of SSI
- 5.2.11 Identify the net work of financial assistances given to SSI
- 5.2.12 Identify the different constituents of feasibility study
- 5.2.13 Prepare the feasibility report / project report

5.3.0 Recognize the features of Industrial Safety

- 5.3.1 Explain the importance and need for safety measures in industries
- 5.3.2 Define the meaning of the term – factory, accident, frequency rate, security rate, accident pronnes, unsafe acts, unsafe conditions, job safety analysis, plant safety inspections
- 5.3.3 Identify the various accident factors, mechanical factors, environmental factors, personal factors
- 5.3.4 Discuss the 4 E's of accident prevention technique
- 5.3.5 List the precautions to be observed while working in an hazardous environment
- 5.3.6 Explain briefly the artificial respiration methods

5.4.0 Recognize the causes of environmental pollution and steps to be taken to control the pollution

- 5.4.1 Define the terms Ecology and Ecosystem
- 5.4.2 Explain the impact of industrial development on environment
- 5.4.3 Explain the causes and effects of air and water pollution on plant, animal life and materials
- 5.4.4 Identify the characteristics of industrial and municipal waste
- 5.4.5 Outline the various treatment processes
- 5.4.6 Identify the sources of air pollutants
- 5.4.7 State the effects of air pollution
- 5.4.8 Outline the methods of prevention and control of air pollution
- 5.4.9 Explain the term solid waste management
- 5.4.10 List the salient features of environmental pollution control legislation
- 5.4.11 State the functions of pollution control board
- 5.4.12 Define NOISE
- 5.4.13 Identify the causes of noise pollution
- 5.4.14 Explain the various methods of noise control

CONTENT DETAILS

UNIT – 1

1.Principles of management

Introduction – meaning of management: - Management as an art of getting things done, management as a process, management as an activity

Management and administration – Development of management theory: - Taylor’s scientific management, contributions of F.W. Taylor, Henry Fayols principles of management (Brief description), compare F.W. Taylor & Henry Fayol’s contributions

Functions of management: -

- a) Planning: - concept, steps in planning
- b) Organizing: - concept and process steps, steps in organizing
- c) Staffing: - concept, list functions of staffing
- d) Directing: - concept, list the elements of directing
- e) Controlling: - Concept, list the steps in controlling process
- f) Decision making: - concept, steps in decision making, scientific approach to decision making

Different types of ownership: - Sole proprietorship, partnership, private Ltd., company, public Ltd., company, co-operative society (brief description only)

Organizational structure: - Definition of organization, different types of organizational structure: - line, functional, line & staff organization (brief description with advantages & disadvantages)

Leader ship - Define leadership, different types of leadership, qualities of a good leader

Motivation - characteristic of motivation, importance, Marlow s need hierarchy theory, Techniques of motivation

Communication – Types of communication, Barriers in communication.

2. Human Resource Management

Concept of HR Management – Development of HR Management – Components of HRD – Job analysis – Job description – Job specification , Manpower planning – Requirements of manpower planning – Factors affecting the manpower planning – Job evaluation – Steps required for job evaluation – Methods for job evaluation – Merit rating – objectives and methods – performance appraisal. Training – Importance of training – Methods of training – advantages of training (Brief description only)

UNIT - II

1. Quality Planning and Control

Definitions of quality, Requirements of quality, list objectives of quality planning – quality control: - operator’s quality control, inspectors quality control, Mangers quality control, total quality control.

Quality Assurance: - Concept, definition, responsibility of quality assurance department, planning for quality assurance – three prong approach to quality planning: - (1) Product planning (2) Managerial & Operational planning (3) Documentation. Quality management system, quality loop.

2.ISO 9000 & Installation

Concept and role of ISO 9000, what is ISO 9000, whom does it help, elements of ISO 9000, steps for installation of quality system - preparatory step, implementation step, registration & certification step.

Quality Audit - objectives, types off audits: - Adequacy audit, compliance audit, system audit, product audit, first party audit, second party audit, third party audit. Steps required to apply for ISO – 9000 Registration. Benefits of becoming an ISO 9000 company.

3.Understand the concept of TQM and Organizational Excellence

Concept, ten mantras of TQM, the link between ISO 9000 and TQM with the help of TQM Model – organization of TQM. Techniques of TQM - PDCA, Total Employee Involvement (TEI), POKA – YOKA – Failure proofing, JIT manufacturing.

Quality Circles - concept, characteristics, Brain storming method for solving Q.C. Problems.

Organizational excellence through TQM - List the strength, weakness, opportunity and threat (SWOT analysis) of an organization by an example and analyse the current status – mission statement.

UNIT – III

1. Management Techniques – CPM & PERT

Introduction to Network analysis, application of CPM & PERT, scope of CPM & PERT commonly used terms in CPM: - Operation, pre-operation, post operation, concurrent operation, earliest finish time EFT),

latest finish time (LFT), Critical activities, critical path, EVENT, SLACK or FLOAT, Dummy activity, - procedure for CPM, problems on CPM, projects duration, slack, mark critical path (by AOA and AON method).

PERT - comparison between CPM & PERT, procedure for PERT, Estimation of activity time, commonly used terms in PERT, Event, Activity, successor Event, Predecessor event, Earliest Expected Time, Latest allowable time, slack – problems in PERT.

2. Marketing & Sales

Marketing - introduction, definitions, objectives, core concepts: - block diagram, distinguish between marketing and sales, marketing MIX. Buying process & behaviour of consumer, steps in market planning – market segmentation. Sales - importance of sales, functions of sales management, market research, market information system. Forecasting related to marketing and sales

3. The Principles of a good wage payment system

Importance of good wage plan, types of wages - nominal, real, living, fair, minimum wages – requirement of a good wage payment system. Incentives - definitions, types of incentive plan for direct workers - non financial and semi financial incentives – financial incentive plans - straight piece rate system, straight piece rate with guaranteed minimum wage, differential piece rate system, Halsey plan, Rowan plan, Gantt (simple illustrative problems)

4. Material requirement planning (MRP)

MRP objectives & functions – Terminology – MRP systems – MRP outputs – Management information from MRP – Lot sizing considerations – Examples – applications – introduction to MRP – II - Just in time (JIT). (Brief description only)

UNIT – IV

1. Operations Research & Application

Concepts of OR, scope of OR, phases and process of OR, methods of OR -

1. Linear programming: - a) graphical & analytical method b) transportation method: - North west corner rule, Vogel approximation method
2. Waiting line or Queuing theory
3. Game theory

Linear programming: - concepts, formulation of LPP, Do problems on maximization of profit, minimum of total cost (by graphical & analytical method)

Transportation problem: - meaning, compute the initial feasible solution by northwest corner rule & Vogel approximation method (simple problems)

Game theory: - concept, two-persons zero sum game, the maxi-min- mini-max principle –optimal strategy, saddle point, example problems to compute saddle point – waiting line or queuing theory - concept, the information required for formulating a mathematical model (simple problems)

2. Management by objectives (MBO)

Concepts & definition, contents of MBO, sequence of MBO process with block diagram, steps required for MBO, guidelines for setting objectives

3. Management Information Systems (MIS)

Definition of MIS, Data, Information, management, systems concepts of management, a firm and its environment, objectives, contents of MIS, need for information, integrated MIS, functional and activity subsystems, MIS development - line diagram, application of MIS - inventory management, Human resource management, personal decision making.

UNIT – V

1. Industrial Psychology

Meaning, importance of good working conditions and environment: - physical working conditions, psychological working conditions, working conditions related to time, related to social situation. Behavioural dynamics: - self concept and self understanding, inter personal needs, developing interpersonal relationship: - framing first impression, developing mutual expectations, honouring psychological contracts, developing trust & influence, projecting positive qualities and hiding negative points – developing better behaviour and qualities a TQM approach: - conducting ‘SWOT’ analysis for self understanding, prepare incremental projects to reduce weakness and threats - mission statement

2. Small Scale Industries – Entrepreneur

List steps required to start small scale industry, procedure for registration (provisional and permanent registration) – sources of financial assistance, govt., assistance for development of SSI, preparation of project report, Tax: - an overview of income tax – excise duty, sales tax – procedure to be followed for sales tax

3. Industrial Safety

Define Accident, Frequency rate, severity rate, and accident proneness.

List the causes of accidents: - Mechanical, Environmental, personnel factors accident prevention techniques – 4 E'S of Accident prevention technique

4. Environmental Pollution and control

Ecology and Eco system, Impact of industrial development on environment, Causes and effects of air and water pollution on plant, animal life and material, Characteristics of industrial and municipal waste, Treatment processes:- Primary, secondary and tertiary, Sources of air pollutants on human beings, Effects of air pollutants on human beings, Prevention and control of air pollution, Solid waste management, Environment pollution control legislation and functions of pollution control boards, Causes of noise pollution and its control

Special Instruction to Question Setters

1. All units should be given equal weightage of marks
2. Problems from wage plan, CPM-PERT, and O.R should be included in every question paper in order to measure the application capability of students

REFERENCE BOOKS

- | | |
|---|--|
| 1. Industrial Engineering & production management | – Martand.T.Telsang
S.chand & Company |
| 2. Industrial Engineering & Management | - O. P. Khanna |
| 3. Operations Research | - Premkumar Guptha, D.S. Hira |
| 4. TQM | - Productivity Council |
| 5. ISO | - Tapan.P.Bagachi |
| 6. Entrepreneurship Development | - Jagmer Singh Saihi |
| 7. Industrial Management & Engineering Economics | - Banga & Sharma |

SUBJECT : INFORMATION SECURITY
SUBJECT CODE : CM 602
PERIODS/WEEK : 6
PERIODS/SEMESTER : 96

TIME SCHEDULE

	UNIT	TOPIC	PERIODS
1		Introduction to Computer Security	8
2		Hardware Security Features And Unix Security	18
		Test	02
3		Intruders and Malicious Software	18
4.		Cryptography	18
		Test	02
5		Network Security	18
		Test	02
Total			96

Objectives

- 1 Introduction to Computer Security**
 - 1.1 Discuss Computer Security aspects: Confidentiality, Integrity, Availability, Accountability, Nonrepudiation, Reliability
 - 1.2 Compare Data Vs Information
 - 1.3 Study Principles of Computer Security: Focus of Control, The Man-Machine scale, Complexity Vs Assurance, Centralized or Decentralized controls
Recovery tools, Unix devices, Object reuse, Buffer Overruns, Backup, Core Dumps
 - 1.4 Understand Identification and Authentication
 - 1.4.1 Understand Username and password
 - 1.4.2 Understand Spoofing attacks
 - 1.4.3 Understand Protecting the Password file
 - 1.5 Understand Authentication and Authorization
 - 1.5.1 study Access Operations
 - 1.5.2 study Ownership
 - 1.5.3 study Access control structures
 - 1.5.4 study Intermediate Controls
 - 1.5.5 study Partial Orderings

- 2 Study Hardware Security Features - Unix Security**
 - 2.1 Understand Hardware Security
 - 2.1.1 Study Protection in the Security Kernel
 - 2.1.2 Study Protection on the Intel x86 Systems
 - 2.1.3 Study Protecting Memory: Secure Addressing
 - 2.2 Study Unix Security
 - 2.2.1 Discuss Unix Security Principals : User Accounts, Superuser, Groups
 - 2.2.2 Understand Subjects: Login and password, shadow password file
 - 2.2.3 Understand Objects: The Inode, Default permissions, Permissions for Directories
 - 2.2.4 Understand and experiment Access Control: Set userid and set groupid, changing permissions

- 2.2.5 Study General Security Principles: Controlled Invocation, Deleting files, Protection of Devices, Changing the Root of the file system, Mounting File systems, Environment variables, Searchpat, Wrappers
- 2.2.6 Study Management Issues

3 Understand Intruders and Malicious Software

- 3.1 Study Intrusion
 - 3.1.1 Understand Classes of Intruders: Masquerader, Misfeasor, Clandestine user
 - 3.1.1 Discuss Intrusion Techniques
 - 3.1.2 Understand Intrusion Detection
 - 3.1.3 Understand Audit Records
 - 3.1.4 Understand Statistical Anomaly Detection
 - 3.1.5 Understand Rule based Intrusion Detection
- 3.2 Discuss Intrusion: Password Management:
 - 3.2.1 Study Password protection
 - 3.2.2 Discuss Password Selection Strategies
- 3.3 Discuss Malicious Software :Viruses and Related Threats
 - 3.3.1 List Malicious Programs
 - 3.3.1.1 Discuss Trap Doors
 - 3.3.1.2 Discuss Logic Bomb
 - 3.3.1.3 Discuss Trojan Horses
 - 3.3.1.4 Discuss Zombie
 - 3.3.2 Study The Nature of Viruses: Virus Structure
 - 3.3.3 Discuss Types of Viruses
 - 3.3.4 Understand Macro Virus
 - 3.3.5 Understand E-mail Virus
 - 3.3.6 Understand Worms
- 3.4 Discuss Malicious Software : Virus Counter Measures
 - 3.4.1 Study Antivirus Approaches
 - 3.4.2 Study Advanced Antivirus Techniques
 - 3.4.2.1 Study Generic Decryption
 - 3.4.2.2 Study Digital Immune System
 - 3.4.3 Understand Behavior-Blocking Software

4 Study Cryptography

- 4.1 Study Cryptographic Keys
- 4.2 Study Cryptographic Mechanisms
- 4.3 Study Integrity Check Functions
- 4.4 Study Digital Signatures
- 4.5 Study Encryption
 - 4.5.1 Study Data Encryption Standard
 - 4.5.2 Understand Block Cipher Modes
 - 4.5.3 Understand RSA Encryption
- 4.6 Understand Strength of Mechanisms

5 Study Network Security

- 4.6 Understand IP Security
 - 4.6.1 List Applications of IPsec
 - 4.6.2 State Benefits of IPsec
 - 4.6.3 Understand IP Security Architecture
- 4.7 Study Web Security
 - 4.7.1 Discuss Web Security Aspects
 - 4.7.1.1 List Web Security Threats
 - 4.7.1.2 Discuss Web Traffic Security Approaches
 - 4.7.2 Understand Secure Socket Layer and Transport Layer Security
 - 4.7.2.1 Study Secure Socket Layer Architecture

- 4.7.2.2 Study Secure Socket Layer Record Protocol
- 4.7.2.3 Understand Change Cipher Spec Protocol
- 4.7.2.4 Understand Alert Protocol
- 4.7.2.5 Discuss Cryptographic Computations
- 4.7.2.6 Study Transport Layer Security
- 4.7.3 Study Secure Electronic Transaction
 - 4.7.3.1 Understand Payment Processing : Purchase request, Payment authorization and Payment capture
- 4.7.4 Study Firewalls
 - 4.7.4.1 Understand Firewall Design Principals
 - 4.7.4.2 List Characteristics
 - 4.7.4.3 State Types of Firewalls
 - 4.7.4.4 Study Firewall configurations
 - 4.7.4.5 Discuss Trusted Systems
 - 4.7.4.6 Discuss Trojan Horse Defense

Content Details

UNIT -1

Introduction to Computer Security

Introduction to Computer Security-Computer Security aspects, Principles of Computer Security, Identification and Authentication, Authentication and Authorization

UNIT -2

Hardware Security Features and Unix Security

Hardware Security Features- Protection in the Security Kernel, Protection on the Intel x86 Systems- Protecting Memory: Secure Addressing- Unix Security-Security Principles - Access Control. General Security Principles, Management Issues

UNIT -3

Intruders and Malicious Software

Intruders- Intrusion, Classes of Intruders, Intrusion Techniques, Intrusion Detection, Audit Records, Statistical Anomaly Detection, Rule based Intrusion Detection. Password Management

Malicious Software -Viruses and Related Threats-Malicious Programs, The Nature of Viruses-Virus Structure-Types of Viruses

Virus Counter Measures -Antivirus Approaches, Advanced Antivirus Techniques, Digital Immune System, Behavior-Blocking Software

UNIT-4

Cryptography

Cryptographic Keys-Cryptographic Mechanisms, Integrity Check Functions, Digital Signatures, Encryption, Data Encryption Standard, Block Cipher Modes, RSA Encryption, Strength of Mechanisms

UNIT-2

Network Security

IP Security -Applications of IPSec, Benefits of IPSec, IP Security Architecture

Web Security- Web Security Aspects, Web Security Threats, Web Traffic Security Approaches

Secure Socket Layer and Transport Layer Security, Secure Socket Layer Architecture, Record Protocol, Change Cipher Spec Protocol, Alert Protocol, Cryptographic Computations, Transport Layer Security,

Secure Electronic Transaction- Payment Processing

Firewall - Firewall Design Principals, Characteristics, Types of Firewalls, Firewall configurations, Trusted Systems.

Reference Books:

1. Computer Security Author: Dieter Gollmann Publisher: Wiley India Edition
2. Cryptography and Network Security –Principles and Practice (Units 3, and 5)
Author: William Stallings, Publisher: Pearson Education
3. Security in Computing
Author: Charles P. Pfleeger and Shari Lawrence Pfleeger
Publisher: Pearson Education

SUBJECT TITLE : MOBILE COMPUTING
SUBJECT CODE : CT 603 /IF 603 /CM 603
PERIODS/WEEK : 5
PERIODS/SEMESTER : 80

<u>UNIT</u>	<u>TOPIC</u>	<u>TIME SCHEDULE</u>	<u>PERIODS</u>
I	Introduction and TCP/IP		14
II	MAC and Telecommunication Systems	15	
		Test - 1	2
III	Satellite and Broadcast Systems		15
IV	Wireless LAN and PAN		15
		Test - 2	2
V	Mobile TCP/IP		15
		Test - 3	2
		Total	80

OBJECTIVES

UNIT – 1

Objectives

UNIT - I

- 1** **Introduction to Mobile Computing**
 - 1.1 Discuss the Applications of mobile computing
 - 1.2 Discuss History of wireless communication
 - 1.3 Study a simplified reference model
 - 1.4 Explain Cellular systems
 - 2** **Understand Protocols and the TCP/IP suite**
 - 2.1 State the need for a protocol architecture
 - 2.2 Explain the TCP/IP protocol architecture
 - 2.3 Explain Internetworking
 - 2.4 Study of Internet protocols
 - 2.5 Study of Transmission control protocol
 - 2.6 Explain user datagram protocol
 - 3** **Understand Medium access control**
 - 3.1 Discuss the motivation for specialized MAC
Study Hidden & exposed terminals, Near & far terminals
 - 3.2 Study of SDMA
 - 3.3 Study of FDMA
- UNIT - II**
- 3.4 Study of TDMA
 - 3.5 Study of CDMA
 - 3.6 Comparison of S/T/F/CDMA
- 4** **Understanding Telecommunication systems**
 - 4.1 Explain GSM
 - 4.1.1 Study Mobile services

	4.1.2	Explain the System architecture
	4.1.3	Study of Radio interface
	4.1.4	Know the Protocols
	4.1.5	Explain Localization & calling
	4.1.6	Explain Handover
	4.1.7	Discuss Security
	4.1.8	Explain New data services
UNIT - III		
5		Understand Satellite Systems
	5.1	List the Applications of satellite systems
	5.2	Know the Basics of satellite systems
	5.2.1	Study of GEO 139
	5.2.2	Study of LEO 139
	5.2.3	Study of MEO 140
	5.3	Explain Routing
	5.4	Explain Localization
	5.5	Explain Handover
6		Understand Broadcast systems
	6.1	Overview of Broadcast systems
	6.2	Explain Cyclic repetition of data
	6.3	Study of Digital audio broadcasting
	6.3.1	Explain Multimedia object transport protocol
	6.4	Study Digital video broadcasting
UNIT - IV		
7		Understand Wireless LAN
	7.1	Compare Infrared and radio transmission
	7.2	Study the Infrastructure & adhoc network
	7.3	Study IEEE802.11 standard
	7.3.1	Explain System architecture
	7.3.2	Explain Protocol architecture
	7.3.3	Study the Physical layer
	7.3.4	Study Medium access control layer
	7.3.5	Discuss Mac management
	7.3.6	Discuss Future development
	7.4	Know Bluetooth Technology
	7.4.1	List the Bluetooth applications
	7.4.2	Discuss Bluetooth standards documents
	7.4.3	Study Protocol architecture
	7.4.4	Discuss Usage models
	7.4.5	Discuss Piconets & Scatternets
	7.4.6	Explain Radio specification
	7.4.7	Explain Baseband specification
	7.4.8	Study Frequency hopping
	7.4.9	Study Physical links
	7.4.10	Explain Packets(outline)
	7.4.11	Study Error Correction
	7.4.12	Explain Logical channels
	7.4.13	Study Channel control
	7.4.14	Explain Bluetooth Audio(outline)
	7.4.15	Discuss Bluetooth Security
	7.4.16	Outline Link manager specification
	7.4.17	Outline logical link control and adaptation protocol
	7.4.18	Study L2CAP Channels
	7.4.19	Study L2CAP packets

	7.4.20	Discuss Signaling commands
	7.4.21	Discuss Quality of service
UNIT - V		
8		Understand Mobile network layer
8.1		Know the Mobile IP
	8.1.1	Discuss Goals, assumptions & requirements
	8.1.2	Explain Entities & terminology
	8.1.3	Describe IP packet delivery
	8.1.4	Discuss Agent advertisement & discovery
	8.1.5	Study Registration
	8.1.6	Study Tunneling & encapsulation
	8.1.7	Study Optimizations
	8.1.8	Study Reverse tunneling
	8.1.9	Study IPv6
8.2		Know Dynamic host configuration protocol
9		Understand Mobile transport layer
9.1		Study Traditional TCP
	9.1.1	Explain Congestion control
	9.1.2	Explain Slow start
	9.1.3	Explain Fast retransmit & fast recovery
	9.1.4	Explain Implication on mobility
9.2		Study Indirect TCP
9.3		Study Snooping TCP
9.4		Study Mobile TCP
9.5		Discuss Fast retransmit & fast recovery
9.6		Study Transmission/time out freezing
9.7		Explain Selective retransmission
9.8		Study Transaction oriented TCP

CONTENT OUTLINE

UNIT – I

Introduction to mobile computing- application-history, reference model, cellular systems – Protocol , TCP/IP protocol, Internetworking, Internet protocols, TCP, User Datagram Protocol,- MAC, Hidden & Exposed terminals, Near and Far terminals, SDMA, FDMA

UNIT II

TDMA, CDMA, - Telecommunication Systems, - GSM, mobile services, architecture, radio interface, protocols, localization, handover, security

UNIT III

Satellite Systems- Applications, GEO 139, LEO 139, MEO 140, - Routing- Localization, Handover,- Broadcast systems, cyclic repetition, digital audio and video broadcasting

UNIT IV

Wireless LAN- infrared/radio transmission, IEEE 802.11 – architecture, system and protocol , physical layer, MAC layer- Blue Tooth – applications, standard, usage models, Piconets, Scatternets, Radio specification, Baseband application, Frequency Hopping, Physical Links- Packets, Error correction, channel control , Bluetooth audio, security, Link manager specification, LLC, L2CAP Channels and packets, Signaling Commands

UNIT V

Mobile network Layer- Mobile IP- Entities and Terminology, IP Packet delivery, Agent advertisement and discovery- Registration, Tunneling and Encapsulation, Optimisation , Reverse Tunneling, IPv6- Dynamic host configuration protocol, - Mobile Transport Protocol- Congestion control- Slow start, Fast retransmit & fast recovery- Indirect TCP, Snooping TCP, Mobile TCP, Selective re-transmission, Transaction oriented TCP

REFERENCE BOOKS

1. Wireless communications & networks - William Stallings, PHI
2. Mobile communications - Jochen Schiller, Pearson Publishers

REFERENCE WEB SITES

1. www.palowireless.com
2. www.java.sun.com

SUBJECT TITLE : **HARDWARE LAB – V**
(**COMPUTER HARDWARE & NETWORKING**)
SUBJECT CODE : **CM604**
PERIODS/WEEK : **6**
PERIODS/SEMESTER : **96**

CONTENT DETAILS

1. Demonstration of mother board – identification of processor sockets and CPU support, memory module support, power connector, keyboard connector, BIOS, bus slots, chipset, cache memory, co-processors, CMOS battery, CMOS chipset etc
2. Demonstration of SMPS – connector identification – measurement of voltages in various connectors – plugging the connector in motherboards and devices like HDDs, FDDs, CD-ROMs, CTDs etc – various power supply problems.
3. Demonstration of display adapters – identification of various adapters – demonstration of monitor – identification of various monitors
4. Demonstration of keyboards – identifying various types of keyboards
5. Demonstration of various FDCs and FDDs – identifying major assemblies on a drive – connecting practice
6. Demonstration of HDDs – identifying the HDDs with different interfacing – connecting details – master slave connection
7. Demonstrating the system assembly – CPU – cooler fan, SMPs – memory – display adapter – monitor – keyboard – FDC and FDD – HDD
8. Demonstrating the errors during the POST – configuring the peripherals in CMOS RAM – Booting from FDD – bootable disk preparation – preparation of HDD (LLF - partitioning – HLF)
9. Demonstration of fixing the parts in the cabinet - connecting front panel connections
10. Demonstration of CONFIG.SYS and AUTOEXEC.BAT with various parameters
11. Demonstration of various with serial – parallel – PS-2 interfaces – USB ports
12. Demonstration of CDs – Drives – Drive installation procedure – CD writer installation and writing practice
13. Installation windows and Linux operating system from CDs and HDDs – installation of drivers of display
14. Demonstration of modern identification – installation procedures
15. Demonstration of DMPs – inkjet printers – installation under DOS and WINDOWS platforms – Head/cartridge assembly procedures – various troubles with printers
16. Demonstration of scanner – installation and connection procedures

Trouble Shooting

1. Various troubles and rectification procedures of motherboard – CPU – memory modules – display adapters – monitors – SMPS – keyboards – FDC, FDDs, HDC, HDD – CMOS setup – CDROM driver – sound cards – DMP – inkjet printer – scanners – modern - mouse
2. OS related problems (DOS, WINDOWS 98, LINUX)
3. Other software installation procedures
4. Virus problem and solution – Antivirus software

Networking

1. Demonstration of networking – novel Netware / Windows NT – cabling practice – server / client techniques – network administration – uses management – printer connection – basic troubleshooting on networks
2. Internet
3. E-mail etc

SUBJECT TITLE : **SOFTWARELAB – VI**
(ASSEMBLY LANGUAGE PROGRAMMING)
SUBJECT CODE : **CM605**
PERIODS/WEEK : **3**
PERIODS/SEMESTER : **48**

OBJECTIVES

Implementing advanced programs

- Write Program for clear the screen
- Write program to echo type character
- Write program display all the characters
- Write program for data transfer type
- Write program for string processing type
- Write program for converting a string to BOLD format
- Write program for converting HEX to BCD conversion
- Write program for String comparison
- Write program for string reverse
- Write program for solving problems like LCM, GCD
- Write program for displaying system clock
- Write program for drawing figures like triangle
- Write program for file creation, file processing , etc
- Write program for largest of an array
- Write program for binary to gray
- Write program for decimal multiplication
- Write program for sorting decimal numbers
- Write program for case conversion of string
- Write program for password checking
- Write program for check palindrome
- Write program for string search
- Write program for printing
- Write program for generating random numbers
- Write program for sum of arithmetic progression
- Write program for positioning the cursor

CONTENT DETAILS

Advance programming concepts in 8086. - Programs for : clear the screen, display all the characters, data transfer type, string processing type, string to BOLD format, HEX to BCD conversion, String proc, data conversion, LCM, GCD, system clock, Draw a triangle, file creation, file processing , etc

SUBJECT TITLE : SOFTWARE LAB – V (NETWORK PROGRAMMING)
SUBJECT CODE :CM606
HOURS/WEEK : 3
HOURS/SEMESTER :48

Objectives

1. Revise Java Programming concepts
2. Revise Sample programs using Packages
3. Revise Sample programs using Interface
4. Revise Sample programs with Exception handling
5. Revise Sample programs for input and output
6. Simple programs using threads
7. Implement various Thread functions using Thread class
8. Implement thread using Runnable Interface
9. Implement Multithreading
10. Implement Inter-thread communication
11. Revise Interactive programming using Applets(minimum 3 nos.)
12. Client-Server programs using Applets and Servlets
13. find out the current IP address of the machine
14. display a particular web page from an applet
15. Viewing a File
16. Compressing a File
17. Implement socket(minimum 3 nos)
18. Implement Server Sockets
19. Implement RMI
20. Net Chat

Text Book : JAVA RMI by William Grosso : O'REILLY publications Indian Reprint
by SHROFF publishers and Distributors Pvt. Ltd.

Ref Book : Java Network Programming by Elliotte Rusty Harold
Java Network Programming by Hughes Et Al

Ref. Website: http://www.davidreilly.com/java/java_network_programming/

SUBJECT TITLE : **PROJECT WORK AND SEMINAR**
SUBJECT CODE : **CM607**
PERIODS/WEEK :
Seminar : 3
Project : 3
PERIODS/SEMESTER : **96**

1. Seminar topic must be selected based on the current trends in the computer field. Primary intention of seminar is to develop communication skill of the student. Marks will be awarded depending on the presentation, subject and the report.
2. Report must be submitted prior to the presentation.
3. Hardware / Software project must be related to the current demand in the industry. Marks will be awarded by an interim evaluation in the middle and at the end of the project. Report may contain the following:
 - a. Detailed system study
 - b. Data Flow Diagram/System flowchart/Circuit diagram
 - c. Program flowchart / PCB / Layout drawing
 - d. Source code for the important modules / Maintenance schedules
 - e. Output screen formats/explanation of working of the system / Testing formats.

List of Faculty who made Contributions to the Curriculum Revision 2006

Sl. No	Name	Designation
1	Shri. Balu John	Asst. Professor in IT, Govt. Engineering College, Barton Hill
2	Sri. Philip Kurian	Asst. Professor&Head in Charge, NITTTR Extn Centre, Kalamassery
3	Sri. Kulanthaivel	Lecturer, NITTTR, Chennai.
4	Smt. Malligai	Lecturer, NITTTR, Chennai.
5	Smt. Bindu P.S.	Head of Section in Computer Engg
6	Sri. Saji T	Head of Section in Computer Engg
7	Sri. Suresh Kumar C.P	Head of Section in Computer Engg
8	Sri. Solomon P.Y	Head of Section in Computer Engg
9	Smt. Beena S.	Head of Section in Computer Engg
10	Shri. Manoj P.S	Technical Officer, O/o JCTE
11	Sri. Abdul Nasser Kaipancherry	Lecturer in Computer Engg
12	Sri. Pradeep Kumar	Lecturer in Computer Engg
13	Smt. Bindu Vinod	Lecturer in Computer Engg
14	Sri. Biju M.J	Lecturer in Computer Engg
15	Sri. Roy Thomas	Lecturer in Computer Engg
16	Sri. Pramod Chathampalli	Lecturer in Computer Engg
17	Sri. Subin Paul	Lecturer in Computer Engg