COUNCIL OF
HIGHER SECONDARY EDUCATION
ODISHA, BHUBANESWAR

COURSES OF STUDIES
IN
VOCATIONAL STREAM
(PART-I)
AGRICULTURE, PARAMEDICAL
&
ENGINEERING GROUP

FOR THE
HIGHER SECONDARY VOCATIONAL EXAMINATION
2015 AD

Rs. 20.00

CONTENTS

SCHEME OF STUDIES FOR VOCATIONAL

The following combinations in Vocational Stream are allowed. Any deviation of this will not be entertained.

Compulsory Subjects

Compulsory subjects English and M.I.L. carry 200 marks each

(100 Marks in 1st year and 100 marks in 2nd year)

1. English
2. M.I.L. (Oriya / Telugu/ Bengali/ Urdu & Persian/ Hindi/ Sanskrit/ Alternative English)
3. **Environmental Education (Compulsory) 100 marks**

   The Environmental Education will be assessed at the college level for 100 marks (70 marks for theory and 30 marks for project work) at the end of 1st year +2 course and the grades (A+, A, B, C, D, in order of merit) are to be awarded by the College and the same shall be recorded in the body of the pass certificate given by the council subsequently. The grade secured in the Environmental Education (EE) will not affect the result of the candidate.

4. **Yoga** : Yoga will be taught as acompulsory subject and assessed at the College level for 100 Marks (50 Marks in Theory and 50 Marks in Practical). The Theory Examination shall be conducted at the end of 1st year class (11th class) and Practical Examination shall be conducted at the time of Test Examination in 2nd Year (12th class)

   The grades are to be awarded by the college and the same shall be recorded in the body of the pass certificate given by the secured in Yoga will not affect the result of the candidate.

Marks	**Grades**
70% and above	Gr - A+
60% to 69%	Gr - A
50% to 59%	Gr - B
35% to 49%	Gr - C
Below 35%	Gr - D

GROUP - A

(A student can opt any one of the following TRADE subjects)

B.F.C. SUBJECT	TRADE SUBJECTS
(i) Physics	.A. V. T.
(ii) Chemistry	.E. D. A.
(iii) Mathematics	.B. M.
.	P. D. F. M.
.	.C. T.

GROUP - B

(A student can opt any one of the following TRADE subjects)

B.F.C. SUBJECT	TRADE SUBJECTS
I. Physics	.D. F.
2. Chemistry	.P. F.
3. Biology	.HOR.
	.S. E. R.
	.I. F.
	.C. F.
	M. L T

(A student can opt any one of the following TRADE subjects)

B.F.C. SUBJECT	TRADE SUBJECTS
(i) Physics	.A. V. T.
(ii) Chemistry .	E. D. A.
(iii) Mathematics	.B. M.
.	P. D. F. M.
	.C. T.

GROUP - B

(A student can opt any one of the following TRADE subjects)

B.F.C. SUBJECT	TRADE SUBJECTS
I. Physics	.D. F.
2. Chemistry	.P. F.
3. Biology	.HOR.
	.S. E. R.
	.I. F.
	.C. F.
	M. L T

INTRODUCTION TO NEW COURSE STRUCTURE & DISTRIBUTION OF MARKS IN SUBJECT, HAVING PRACTICALS

With the introduction of the New Course structure from the academic session 2008-09 basically to de-stress the students joining +2 courses under the CHSE, Orissa, there will be yearly examinations at the end of 1st year and 2nd year classes. 1st year and 2nd year courses have been separated accordingly. The 1st Year examination will be conducted at the college / H.S. School level for 750 marks and the 2nd year examination will be conducted at the Council level for 650 marks. Marks secured in the 1st year examiantion shall be considered only for promotion of students to the 2nd year class and will have no bearing on the terminal examiantion, conducted by the Council at the end of the 2nd year.

Pass certificates will be awarded to successful candidates basing on the performance in the Council examination at the end of the 2nd year only.

DISTRIBUTION OF MARKS IN THEORY

Group A

Objective type - Compulsory

1. Multiple Choice (from all units) - 1 x 5 = 05 marks
2. One word answer / very short answer/correct the sentence / fill up the blanks (from all units) - 1 x 10 = 10 marks

Group - B

3. Short answer type bits of
   2 marks each. - 7 x 2 = 14 marks
   (7 to be answered out of 10 from all units)

Group C

Long Type

4. Answer any 3 questions for all units - 3 x 7 = 21 marks
   (3 to be answered out of 5) 50 marks

DISTRUBUTION OF MARKS IN PRACTICAL

1.	Major Experiments	- 40 marks
(i)	Theory and Procedure	- 20 marks
(ii)	Tabulation	- 10 marks
(iii)	Calculation & inference	- 10 marks
1.	Minor Experiments	- 20 marks
(i)	Theory a	- 10 marks
(ii)	Tabulation Calculati and inference	- 10 marks
1.	Bit Experiments Specimen / Sample / Sporting / any other specific project / materials preparation by the students.	- 20 marks
4.	Viva Voce	- 10 marks
5.	Records	- 10 marks
		100 marks

External and Internal Examiners are requested to decide different experiments to be set during the course of examination.

ENGLISH

Compulsory

Higher Secondary education for a large number of students is a preparation for the University, where a fairly high degree of proficiency in English language and literature is necessary. For another large and significant group, the higher secondary education is a preparation for entry into professional education. This Course, therefore, is designed to cater to both the groups by promoting higher skills of thinking as well as language skills required for academic study and for the workplace. In this sense, this syllabus is learner-centred or need-centred.

It is expected that students have acquired the basic language skills in English by the time they come to the First Year of the +2 class. It is necessary that by the end of +2 they should be equipped with adequate linguistic competence to comprehend and appreciate texts, and express themselves in clear and grammatical English using appropriate punctuation and cohesive devices. The aim of this syllabus, therefore, is to hone all the language skills (L-S-R-W) of the students.

Instructional Materials consist of 4 textbooks : (a) Invitation to English-I (New Edition), which includes non fictional prose pieces and poems, for intensive study (b) Invitation to English-II (New Edition), which includes genres like short fiction, one-act play and biography/autobiography for extensive study, (c) Invitation to English -3, a Work Book for developing writing skills, and (d) Invitation to English -4, a Work Book for grammatical exercises.

The present syllabus envisages a lot of teacher-pupil interaction. While dealing with texts for both intensive and extensive study, teachers should encourage group activity in the classroom for 'Pre-reading', 'While-reading', and 'Post-reading activities'. They should be careful not to put any question to an individual student but to a group of 3 - 4 students encouraging one of them to give the answer with the feedback he/she gets from the group so that none of the students shall feel diffident to interact. As Invitation to English -3 and Invitation to English -4 are Work Books, they should be worked out in the class-room.

The Scheme of Evaluation, at the end of the syllabus, specifies the allocation of marks for each skill. It should be noted that texts prescribed for detailed as well as non-detailed study have been allotted only 60 marks out of total 200. It would be appropriate, therefore, to devote the bulk of classroom time to Invitation to English -3, and Invitation to English -4,

INSTRUCTIONAL METERIALS FOR THE HIGHER SECONDARY CLASSES (ARTS/SCIENCE/COMMERCE)

1. For Intensive Reading: An anthology of non-fictional prose pieces and poems

Book prescribed: Invitation to English-I (New Edition, 2012)

Published by Odisha Sate Bureau of Text Book Preparation and Production, Bhubaneswar.

Pieces to be studied in the 1st year

A. Prose:

i.	Standing Up for Yourself	Yevgeny Yevtushenko
ii.	The Legend behind a Legend	Hariharan Balakrishnan
iii.	The Golden Touch	Nathaniel Hawthorne
iv.	In London In Minus Fours	Louis Fischer
v.	The Cancer Fight, from Hiroshima to Houston	Ritsuko Komaki

B. Poems:

i.	Stopping by Woods on a Snowy Evening	Robert Frost
ii.	Oft, in the Stilly Night	Thomas Moore
iii.	The Inchcape Rock	Robert Southey
iv.	To My True Friend	Elizabeth Pinard
v.	Fishing	Gopa Ranjan Mishra

Pieces to be studied in the 2nd year

A. Prose:

i.	My Greatest Olympic Prize	Jesse Owens
ii.	On Examinations	Winston S. Churchill

iii.	The Portrait of a Lady	Khushwant Singh
iv.	The Magic of Teamwork	Sam Pitroda
v.	Development of Polio Vaccines	Bonnie A. M. Okonek and Linda Morganstein

B. Poems:

i.	Daffodils	William Wordsworth
ii.	The Ballad of Father Gilligan	William Butler Yeats
iii.	A Psalm of Life	Henry Wadsworth Longfellow
iv.	Television	Roald Dahl
v.	Money Madness	D.H. Lawrence

2. For Extensive Reading:

A collection of short stories, short plays, excerpts from biographies or autobiographies for non-detailed study

Book Prescribed: Invitation to English-II (New Edition)

Published by Orissa State Bureau of Text Book Preparation and Production, Bhubaneswar

Pieces to be studies in the 1st year

i.	Three Questions	Leo Tolstoy
ii.	After Twenty Years	O. Henry
iii.	The Open Window	Saki
iv.	The One and only Houdini	Robert Lado
v.	Childhood	Jawaharlal Nehru
vi.	Marriage	Dr. Rajendra Prasad

Pieces to be studied in the 2nd Year

i.	The Doctor's Word	R K Narayan
ii.	The Nightingale and the Rose	Oscar Wilde
iii.	Mystery of the Missing Cap	Manoj Das
iv.	The Monkey's Paw	W.W Jacobs
v.	My Mother	Charlie Chaplin
vi.	Stay Hungry. Stay Fit.	Steve Jobs

3. Writing Skills:

A Work-Book on writing designed to provide practice in different forms of writing and develop the different skills of writing as specified in the syllabus.

Book Prescribed:
Invitation to English - 3

Published by Odisha State Bureau of Textbook Preparation and Production, Bhubaneswar.

Units to be studied in the 1st Year

I. Writing a Paragraph

II. Developing Ideas into Paragraphs

III. Writing Personal Letters and Notes

IV. Writing Applications, Official Letters and Business letters

V. Writing Telegrams, E-mails, Personal Advertisements and Short Notices

VI. Using Graphics

Units to be studied in the 2nd year

VII. Interpreting Graph, Charts Tables and diagrams etc

VIII. Reporting Events and Business Matters

IX. Note-making and summarizing

X. Extended Writing:

4. Grammar:

A Work Book of Grammar is designed to provide practice in the use of selected grammatical items, in meaningful contexts

Book prescribed:

Invitation to English - 4

Published by Odisha State Bureau of Textbook Preparation and Production, Bhubaneswar.

Units to be studied in the 1st Year

I. Countable and Uncountable Nouns

II. Tense Patterns

III. Modal Verbs

IV. Prepositions

V. The Imperatives

Units to be studied in the 2nd year

I. Revision of 'Tense Pattern's' and 'Modal verbs'

II. Conditionals

III. The Passive

IV. Direct and Reported Speech

V. Interrogatives

VI. Phrasal Verbs

SCHEME OF EVALUATION

There shall be two papers in English – English Paper I and English Paper II – each carrying 100 marks. A written examination for English Paper I shall be conducted by the colleges at the end of the First Year. A written examination for English Paper II shall be conducted by the CHSE, Odisha at the end of the Second Year to test the skills of reading and writing as well as the ability to use grammar in context.

PAPER - I
(To be evaluated at the College Level)

1. Reading Comprehension

(a) Prescribed Prose Pieces. (5 questions to be answered, each carrying 2 marks) 10 marks

(b) Prescribed Poems (5 questions to be answered each carrying 2 marks) 10 marks

(c) Prescribed Extensive Reading Texts (2 questions to be answered carrying 5 marks each; only global, inferential and evaluative questions to be set) 10 marks

2. Reading - related skills

(a) Vocabulary skills 5 marks

(b) Information Transfer 5 marks

(Converting verbal information to non-verbal forms, such as diagrams, charts and tables)

(c) Reordering/sequencing sentences 5 marks

(d) Dictionary/Reference skills

(2 marks on using a dictionary, and 3 marks meanings of a word) 5 marks

e) Cohesive Devices 5 marks

3. Writing skills

a) Letter Writing (personal/official/commercial: Word limit: 150) 10 marks

b) Description of object/event /process (Word limit: 1.50) 10 marks

c) Slogan/telegram/caption writing (Word limit: 10) 5 marks

4. Grammar in context 10 marks

5. Translation/story-developing 10 marks

Total: 100 Marks

PAPER -II

(To be evaluated by the CHSE, ODISHA

1. Reading Comprehension

(a) Prescribed prose Pieces

(5 questions to be answered carrying 2 marks each) 10 marks

(b) Prescribed Poems

(5 questions to be answered carrying 2 marks each) 10 marks

(c) Prescribed Extensive Reading Texts 10 marks

(2 questions to be answered carrying 5 marks each,

only global, inferential and evaluative questions

to be set on a passage of about 250 words) 10 marks

(d) Unseen Prose passage 10 marks

(5 questions including inferential ones, carrying 2 marks each) 10 marks

2. Reading- related skills

a) Vocabulary skills (to be tested on the unseen passage) 5 marks

b) Information transfer (70 words)

(Converting non-verbal information into verbal form) 5 marks

c) Dictionary/Reference skills 5 marks

3. Writing skills

(a) Report writing (200 words) 10 marks

(b) Guided Note making on a given passage 7 marks

(c) Summarizing on the same passage 8 marks

(d) Essay writing (250 words - on given outlines) 10 marks

4. Grammar in context 10 marks

Total: 100 Marks

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M.I.L (ODIA)

@û]ê^òKbûeZúdbûhû (aûrZûcùkK) - IWò@û

_â[cahð - iûrjòZý ieYú - 1 cbûM

_i%ð iõLýû - 100 **icd - 3 N û**

_òeò@W iõLýû - iû¯ûrjòK - 5 (aûhòðK - 80)

_â[c GKK - M\ý (20 _òeò@W) 25 ^´e

1. @iêe \úNò - `Kúe ùcûj^ ùi^û_Zò
2. ùcû icde bûeZ I IWýògû - W. Ké³4P¦â_ûYòMâûjú
3. @ûùceòKûe aògßaò\ýûkdbûù^ - jé\û^¦ eûd
4. ùR÷a bûÄ~õýe@^ê_c aòŠûYò Rò^þ - ùg÷kgße^¦

- Gjò GKKeê 2Uò \úNõ C e cùkK _âgÜ _Wòa ö ùi[ôeê 1Uòe C e 150 g±ùe ù\aûKê ùrja ö
  Gjûe cùfý - 8 ^´e
- 3Uò 3 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e 30 g±ùe ù\aûKê ùrja ö
  Gjûe cùfý 3X2=6 ^´e
- 3Uò 2 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e 2Uò aûKýùe ù\aûKê ùrja ö
  Gjûe cùfý 2X2=4 ^´e
- 3Uòe 1 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e ùMûUòG aûKýùe ù\aûKê ùrja ö
  Gjûe cùfý 1X2=2 ^´e
- 5Uò 1 ^´e aògòÁ _âgÜ _Wòa ö _âùZýK _âgÜ _ûAñ 4Uò ùfLûGñ i¸ûaý C e \ò@û~òa ö ùi[ôcºeê _eúlû[õúùKak VòKþ C eUò aûQò ùfLôùa ö
  Gjûe cùfý 1X5=5 ^´e

\ßòZúdl GKK - _\ý (20 _òeò@W) 25 ^´e

1. iZý@û´K[û - iûekû \ûi
2. QûU _KûA Kùf Pò«û - RM'ÜÛ[\ûi
3. ieiúùe eûRK^ýû - Kaò icâûU Cù_¦âb¬

4. MfûYòZ MfûK[û–Kaò ii~ðý akù\a e[

5. iZýùe ceòaò iZýùe Zeòaò, búc ùbûA û

- Gjò GKKeê 2Uò \úNõ C e cikK _âgÜ _Wòa ö ùi[ôeê 1Uòe C e 150 g±ùe ù\aûKê ùja ö
  Gjûe cifý – 8 ^´e
- 3Uò 3 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e 30 g±ùe ù\aûKê ùja ö
  Gjûe cifý 3X2=6 ^´e
- 3Uò 2 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e 2Uò aûKýùe ù\aûKê ùja ö
  Gjûe cifý 2X2=4 ^´e
- 3Uòe 1 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e ùMûUòG aûKýùe ù\aûKê ùja ö
  Gjûe cifý 1X2=2 ^´e
- 5Uò 1 ^´e aògòÁ _âgÜ _Wòa ö _âùZýK _âgÜ _ûAñ 4Uò ùfLûGñ i¸ûaý C e \ò@û~òa ö ùi[ôcºeê _eúlû[ðú ùKak VòK¼p C eUò aûQò ùfLôùa ö
  Gjûe cifý 1X5=5 ^´e

ZéZúd GKK – GKûuòKû (20 _òeò@W) 25 ^´e

1. \ie _ûjûW – _âûYaŞê Ke

2. cKŸcû – ùMû _ûk ùQûUeûd

3. Q\aùagú – aògßRòZþ \ûi

- Gjò GKKeê 2Uò \úNõ C e cikK _âgÜ _Wòa ö ùi[ôeê 1Uòe C e 150 g±ùe ù\aûKê ùja ö
  Gjûe cifý – 8 ^´e
- 3Uò 3 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e 30 g±ùe ù\aûKê ùja ö
  Gjûe cifý 3X2=6 ^´e
- 3Uò 2 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e 2Uò aûKýùe ù\aûKê ùja ö
  Gjûe cifý 2X2=4 ^´e
- 3Uòe 1 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e ùMûUòG aûKýùe ù\aûKê ùja ö
  Gjûe cifý 1X2=2 ^´e

- 5Uò 1 ^´e aògòÁ_âgÜ_Wòa ö_âùZýK_âgÜ_ûAñ 4Uò ùfLûGñ i¸ûaýC e \ò@û~òa ö ùi[ôc°eê _eúlû[ðú ùKak VòKþC eUò aûQò ùfLûòa ö

  Gjûe cìfý 1X5=5 ^´e

PZê[ð GKK – aýûKeY (20 _òeò@W) 25 ^´e

1. _âaõ] eP^û / bûa iõ_âiûeY
2. eìXò_âùdûM
3. _\^ò‰ðd

- Gjò GKKeê _âaŞeP^û @[aû bûaiõ_âiûeYùe 2Uò _âgÜ @ûiòa ö ùi[ôeê 1Uòe C e 150 g± c°ùe ù\aûKê ùja

  Gjûe cìfý – 8 ^´e

- eìXò_âùdûMeê 8Uò_âgÜ @ûiòa ö ùi[ôeê 5Uòe C e ù\aûKê ùja ö_âùZýK eìXòe @[ð^ò‰ðd_ûAñ 1 ^´e I aûKýùe _âùdûM_ûAñ 1 ^´e ejòa ö

  Gjûe cìfý – 2X5=10 ^´e

- _\^ò‰ðd_ûAñ GKM\ý @^êùQ\ \ò@û~òa ö ùi[ôùe aýajéZ 10Uò ùeLûuòZ _\eê 7UòKê PòjÜûA ù\aûKê ùja ö

  Gjûe cìfý – 1X7=7 ^´e

M.I.L (ODIA)

@û]ê^òKbûeZúdbûhû (aûrZûcìkK) - IWò@û

\ßòZúd- iûjòZý ieYú - 2 dbûM

_ì%ð iõLýû - 100 **icd - 3 N û**

_òeò@W iõLýû - iú¯ûjòK - 5 (aûhòðK - 80)

_â[c GKK - M\ý (20 _òeò@W) 25 ^´e

1. RûZúdRúa^ùe iûjòZýe iÚû^ - aògß^û[Ke
2. lcû - cûdû]e cû^iõõj
3. bêf - bêaù^gße ùaùjeû
4. RûZòe Rúa^ I iõÄéZò - ùMûùfûKaòjûeú]k

- Gjò GKKeê 2Uò \úNõ C e cìkK _âgÜ _Wòa ö ùi[ôeê 1Uòe C e 150 g±ùe ù\aûKê ùja ö
  Gjûe cìfý - 8 ^´e
- 3Uò 3 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e 30 g±ùe ù\aûKê ùja ö
  Gjûe cìfý 3X2=6 ^´e
- 3Uò 2 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e 2Uò aûKýùe ù\aûKê ùja ö
  Gjûe cìfý 2X2=4 ^´e
- 3Uòe 1 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e ùMûUòG aûKýùe ù\aûKê ùja ö
  Gjûe cìfý 1X2=2 ^´e
- 5Uò 1 ^´e aògòÁ _âgÜ _Wòa ö _âùZýK _âgÜ _ûAñ 4Uò ùfLûGñ i¸ûaý C e \ò@û-òa ö ùi[ôc°eê _eúlû[ðúùKak VòKþ C eUò aûQò ùfLôùa ö
  Gjûe cìfý 1X5=5 ^´e

\ßòZúd GKK - _\ý (20 _òeò@W) 25 ^´e

1. P¦âbûMû - eû]û^û[eûd
2. iÚ ìk Kùkae ^êjA @ce - Mwû]e ùcùje
3.]cð_\e @ûcôfò_ò - ùMû_aSê \ûi

4. Mâûc gàgû^ – iyò\û^¦ eûCZeûd

5. aògßRúa^ _ù[– eû]ûùcûj^ MW^ûdK

- Gjò GKKeê 2Uò \úNõ C e cìkK _âgÜ _Wòa ö ùi[ôeê 1Uòe C e 150 g±ùe ù\aûKê ùja ö
  Gjûe cìfý – 8 ^´e
- 3Uò 3 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e 30 g±ùe ù\aûKê ùja ö
  Gjûe cìfý 3X2=6 ^´e
- 3Uò 2 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e 2Uò aûKýùe ù\aûKê ùja ö
  Gjûe cìfý 2X2=4 ^´e
- 3Uòe 1 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e ùMûUòG aûKýùe ù\aûKê ùja ö
  Gjûe cìfý 1X2=2 ^´e
- 5Uò 1 ^´e aògòÁ _âgÜ _Wòa ö _âùZýK _âgÜ _ûAñ 4Uò ùfLûGñ i¸ûaý C e \ò@û~òa ö ùi[ôc°eê _eúlû[ðúùKak VòKþ C eUò aûQò ùfLôùa ö
  Gjûe cìfý 1X5=5 ^´e

ZéZúd GKK – MÌ (20 _òeò@W) 25 ^´e

1. Gùa c¤a ôPò – ùMî\ûaeúg cjû_ûZâ
2. aòÜþNe I ùekMûWò – Kûkò¦ú PeY _ûYòMâûjú
3. @ù^K iàòZ ji – cù^ûR \ûi
4. \gõ^ – aúYû_ûYò cjûk«ò

- Gjò GKKeê 2Uò \úNõ C e cìkK _âgÜ _Wòa ö ùi[ôeê 1Uòe C e 150 g±ùe ù\aûKê ùja ö
  Gjûe cìfý – 8 ^´e
- 3Uò 3 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e 30 g±ùe ù\aûKê ùja ö
  Gjûe cìfý 3X2=6 ^´e
- 3Uò 2 ^´e aògòÁ _âgÜ _Wòa ö ùi[ôeê 2Uòe C e 2Uò aûKýùe ù\aûKê ùja ö
  Gjûe cìfý 2X2=4 ^´e

- 3Ùòe1^´eaògòÁ_âgÜ_Wòaöùi[ôeê2ÙòeCeùMÎÙÒGaûKýùeù\aûKêùjaö

  Gjûecìfý1X2=2^´e

- 5Ùò1^´eaògòÁ_âgÜ_Wòaö_âùZýK_âgÜ_ûAñ4ÙòùfLûGñi¸ûaýCe\ò@û~òaöùi[ôcºeê_eúlû[ðúùKakVÒKþCeÙòaûQòùfLôùaö

  Gjûecìfý1X5=5^´e

PZê[ðGKK–aýûKeY(20_òeò@W) 25^´e

1. \eLûÉfòL^ö
2. @aùeû]_eúlYö
3. aò_eúZ@[ðùaû]Kg±ö
4. iùcûyûeòZbò'Üû[ðùaû]Kg±ö
5. GK_\úKeYö

- \eLûÉfòL^eê2Ùò_âgÜ_Wòaöùi[ôeê1ÙòeCeù\aûKêùja

  Gjûecìfý–6^´e

- @aùeû]_eúlY^òcù«GKM\ý@^êùb\\ò@û~òaöùi[ôeê5Ùò_âgÜ_Wòaöicɇ_âgÜeCeaûºZûcìkKö

  Gjûecìfý–2X5=10^´e

- aò_eúZ@[ðùaû]Kg±,iùcûyûeòZbò'Üû[ðùaû]Kg±GaõGK_\úKeY_âùZýKeê5Ùòùfl ûGñ?_âgÜ_Wòaöùi[ôeê3ÙòùfLûGñKeòaûKê_Wòaö

  Gjûecìfý–1X3=3, 1X3, 1X3=9^´e

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M.I.L. (HINDI)

+2 1st Yr Arts, Com & Science

Time : 3 Hours **Full Marks : 100**

There shall be one paper carrying 100 marks. The duration of Examination will be three hours.

Distribution of marks -

HeþêHeg¥ekeÀ:meeefnl³eefJeefJeOee-II: mebÒe[eMekeÀjeeeHegjsefne

[e.keÀeeÒYekeÀeever

1. **Unit -I** (ieÐe) 18 Classes

   meeHeCe&(All)

2. **Unit -II** (keÀeJ³e) 18 Classes

   meeHeCe&(All)

3. **Unit -III** (keÀneveer) 18 Classes

   meeHeCe&(All)

4. **Unit -IV** 18 Classes

   (keÀ) He$euesKeve (Jeefke̳eeheÀJeJeeemeevesHe$e)

   (Ke) Heueeve

DISTRIBUTION OF MARKS FOR MIL (HINDI)

GROUP - A (Objective type)

1. Multiple Choice (From All Units) I, II & III
2. One word answer (-do-) I, II & III
3. Correct the sentences (-do-)
4. Fill up the Blanks I, II & III

GROUP - B (SHORT TYPE)

5. Write notes on any five (From Unit-I, II & III)

6. Explain only (From Unit - I & II)

GROUP - C (LONG TYPE)

7. Four Long questions

   From I & II Units

   From II & IV Units

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M.I.L. (HINDI)

+2 IInd Yr Arts, Com & Science

Time : 3 Hours **Full Marks : 100**

There shall be one paper carrying 100 marks. The duration of Examination will be three hours.

Distribution of marks -

HepÒeHeglekeÀ:neefn³eefJeefJeOe-II: nb.[e.MekeÀjueeHejesefnle

[e.keÀeeÒYekeÀeever

1. **Unit -I** (ieÐe) 18 Classes

   neeHetCe&(All)

2. **Unit -II** (keÀeJ³e) 18 Classes

   neeHetCe&(All)

3. **Unit -III** (keÀneveer) 18 Classes

   neeHetCe&(All)

4. **Unit -IV** 18 Classes

   (keÀ) He$eueKeve (Jeefke³eleiekeSebDeeJesoveHe$e)

   (Ke) HeuueJeve

DISTRIBUTION OF MARKS FOR MIL (HINDI)

GROUP - A (Objective type)

1. Multiple Choice (From All Units) I, II & III
2. One word answer (-do-) I, II & III
3. Correct the sentences (-do-)
4. Fill up the Blanks I, II & III

GGROUP - B (SHORT TYPE)

5. Write notes on any five (From Unit-I, II & III)

6. Explain only (From Unit - I & II)

GROUP - C (LONG TYPE)

7. Four Long questions

   From I & II Units

   From II & IV Units

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BENGALI

(Compulsory)

The present syllabus in Bengali is designed to improve the Bengali language and knowledge in Bengal literature and Indian Culture. To strengthen the national integrity a profound sense of patriotism and nationalism tempered with the spirit of "Vasundhaiva Kutambakam.

The Syllabus has been divided into two parts. The first part is meant for the students of XI class and the examination of the first part shall be conducted at the end of the XI Class at College/ HS School level.

The Second part of the syllabus is meant for the students of XII Class and the examination of this part shall be conducted at the end of XII Class at Council level.

M.I.L (BENGALI)

(Compulsory)

First year Paper-I

(F M. -100 Time -3 hours and consisting of four units.)

The examination shall be conducted at the end of XI class at College / H.S. School level.

According to the educational policy and guideness given by the Council the Syllabus is prepared as follows:

UNIT - I

Books Prescribed :

PROSE :

Uchha Madhyamik Bangia Sankalan. (Gadya) for Class XI & XII. Published by paschim Banga uchha Madhyamik Siksha Sansad, Viswa Vharati.

The following pieces are to be studied in the first year :

1. Bangladeshe Nilkar - Pyarichand Mitra.
2. Sitar Banabas - Iswarchandra Vidyasagar.
3. Bisarjan - Bankimchandra Chattopadhya
4. Sudra gagaran - Swami Vivekananda.

UNIT - II

POETRY :

Madhukari - Kalidas Ray

(Published by Orient Book Company, Kolkata -12)

The following pieces are to be studied in the first year :-

1. Srigoura Chandra - Gobinda das kabiraj.
2. Bhabollas - Vidyapati.
3. Premer Tulana - Durija Chandidas
4. Avigir Akshep - Gyandas.

UNIT - III

NOVEL - (Non-Detailed)

Srikanta - Sarat chandra chattopadhayay

(Chapter - 1 to 7 (one to seven) to be read in the first year)

UNIT - IV

Grammar

Proverbs and Indioms, Sentence and word formation Annonyms and Synonyms.

Distribution of Marks of Unit wise :-

Unit - I Prose

A. Two short Answer type questions with alternatives -
B. One explanation with alternatives
C. Five very Short Answer type questions with alternative

Unit -II Poetry -

A. Two short Answer type Questions with alternative-
B. One explanation with alternative
C. Five very short answer type questions with alternative

Unit - III Novel (Non datail) -

A. Four short answer type Question with alternative

Unit - IV Grammar & Essay -

A. Grammar objective type 10 Questions with alternative containing 2 marks each

B. Essay/ One essay with three alternatives -

M.I.L (Bengali)

SECOND YEAR

F.M. -100

Time -3 hrs.

The examination shall be conducted at the end of XII Class at Council level.

Books Prescribed :

UNIT - I PROSE :

Uchha Madhyamik Bangia Sankal"an (Gadya) for Class XI & XII.

Published by Paschim Banga Uchha Madhyamik Siksha Sansad, Viswa Varati.

The following pieces are to be studied in the Second year :-

1. Bangia Bhasa - Haraprasad Sastri
2. Tota Kahini - Rabindra nath Tagore
3. Naisha Avijaa - Sarat Ch. Chattopadhayay
4. Aranyak - Bibhuti Bhusan Bandopadhay

UNIT -II POETRY :

Madhukari - Kalidas Ray

(Published by Orient Book Company, Kolkata -12)

Pieces to be Studied :

1. Baisakh - Oebendra Nath Sen
2. Lohar Byatha - Jatindra Nath Sengupta
3. Swarga Haite Viday - Rabindra nath Tagore
4. Rupai - Jasimuddin

UNIT - III NOVEL - (Non-detailed Study)

Srikanta = Sarat Chandra Chattopadhay

(Chapter (8 to 12) eight to twelve to be studied in the Second year.)

UNIT - IV Grammar and Essay

(i) Pada Paribartan

(ii) Somas

(iii) Somo chharita-Bhinna Thark Sobda and its application in sentences.

Distribution of marks of unit wise :-

There shalf be four units.

Unit - I Prose -

A. Two short Answer type questions with alternatives -

B. One explanation with alternatives -

C. Five very Short Answer type questions with alternative -

Unit -II Poetry

A. Two short Answer type Questions with alternative

B. One explanation with alternative

C. Five very short answer type questions with alternative

Unit - III Novel (Non datail) -

A. Four short answer type Question with alternative

Unit - IV Grammar & Essay -

A. Grammar objective type 10 Questions with alternative

B. Essay/ One essay with three alternatives -

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M.I.L (TELUGU)

FIRST YEAR

(Compulsory)

Time 3 hours **No. of Periods : Weekly-5** **Full Marks 100** **Yearly 80**

There shall be one paper carrying 100 marks of 3 hours duration consisting of four units. The examination shall be conducted at the end of First Year of college / H.S. School.

DISTRIBUTION OF MARKS

Group- A (Objective Type)

1.	Thirty very short questions (from unit I, II & III)	30x1 =30 Marks
2.	Ten very questions (from unit IV- A)	10x1=10 Marks

Group- B (short Type Questions)

3.	Six short questions(from Unit I, II & III)	6x2=12 Marks
4.	Four explanation (only Bhavartha from unit I & II)	4x2=8 Marks
5.	Five short questions (from Unit IV-A)	5x2=10 Marks

Group -C (Long Type Questions)

6.	Three long questions with alternative	3x7=21 Marks
7.	Letter writing /essay with alternative(from unit iv-B)	1x9=9 Marks
	TOTAL	100 marks

TOPICS TO BE STUDIED :

UNIT – I **POETRY : (20 periods)**

1.	Ekalavyudu	-	Nannaya Bhattu
2.	Balivamana Samvadamu	-	Bammera Potana
3.	Subhashitamulu	-	Enugu Lakshmana Kavi
4.	Tokachukka	-	Gurajada Apparao
5.	Gongali Purugulu	-	Balagangadhara Tilak
6.	Pushpa Vilapamu	-	Jandhyala Papayya Sastri

UNIT – II PROSE : (20 periods)

1.	Mitra Labhamu	-	Paravastu Chinnayasuri
2.	Vemana	-	Dr G.V.Krishna Rao
3.	C.P. Brown Sahitya Seva	-	Prof. K. Sarvothama Rao
4.	A I D S	-	Dr. Singupuram Narayana Rao
5.	Telugu Patrikala Purva Rangam	-	Namala Visveswara Rao

UNIT – III NON – DETAIL : (16 periods)

Raja Raja Prasasti	-	Prof. S. Gangappa

UNIT – IV (A) GRAMMER : (16 periods)

Vibhaktulu - Pratyayalu, Prakruti - Vikrutulu, Vyatireka Padamulu, Paryaya Padamulu, Jateeyalu - Padabandhalu

B) LETTER WRITING / GENERAL ESSAY: (08 periods)

BOOKS PRESCRIBED :

1. Poetry & Prose : SAHITEE VIPANCHI
- By Dr. Singupuram Narayana Rao

2. Non-Detail : RAJA RAJA PRSASTI
-By Prof. S. Gangappa

3. Grammar : VYAKARANA PARIJATAMU
- By Dr. Singupuram Narayana Rao

M.I.L (TELUGU)

SECOND YEAR

(Compulsory)

Time 3 hours **No of Periods : Weekly-5** **Full Marks 100** **Yearly 80**

There shall be one paper carrying 100 marks of 3 hours duration consisting of four units. The examination shall be conducted at the end of Second Year at Council level.

DISTRIBUTION OF MARKS

Group- A (Objective Type)

1.	Thirty very short questions (from unit I, II & III)	30x1 =30 Marks
2.	Ten very questions (from unit IV- A)	10x1=10 Marks

Group- B (short Type Questions)

3.	Six short questions(from Unit I, II & III)	6x2=12 Marks
4.	Four explanation (only Bhavartha from unit I & II)	4x2=8 Marks
5.	Five short questions (from Unit IV-A)	5x2=10 Marks

Group -C (Long Type Questions)

6.	Three long questions with alternative	3x7=21 Marks
7.	Letter writing /essay with alternative(from unit iv-B)	1x9=9 Marks
	TOTAL	**100 marks**

TOPICS TO BE STUDIED:

UNIT – I POETRY : (20 periods)

1.	Sanjaya Rayabharamu	-	Tikkana Somayaji
2.	Hanumatsandesamu	-	Atukuri Molla
3.	Piradausi Lekha	-	Gurram Jashuwa
4.	Manchi Mutyala Saralu	-	Sri Sri
5.	Jateeyata	-	Dr. Nagabhairava Koteswara Rao

6. Panjaramlo Amma - Dr. Bhusurapalli Venkateswarlu

UNIT – II PROSE : (20 periods)

1. Mitra Bhedamu - Paravastu Chinnayasuri
2. Rayaprolu streevada drukpadham - Prof K.Yadagiri
3. Ahalya Sankrandanam Parta Chitrana - Dr. Nagabhairava Adinarayana
4. Veyipadagalu Samajika Drukpadham - Dr. Singupuram Nayayana Rao
5. Goutama Budhudu - Dr. V.R.Chakravarty

UNIT – III NON – DETAIL : (16 periods)

Rudrama Devi - Smt. P.B. Kausalya

UNIT – IV A) GRAMMAR : (16 periods)

Paribhashika padamulu

Chandssu : Utpalamala, Champakamala,
Sardhulamu, Mathebhamu, Ataveladi, Tetageeti

Alankaramulu : Upama, Rupaka, Utpreksha, Ardhantaranyasa, Atisiyokti

B) RE-TRANSLATION (English to Telugu) :(08 periods)

BOOKS PRESCRIBED :

1) Poetry & Prose : Sahitee Mandaram
- By Dr. Singupuram Narayana Rao

2) Non-Detai : Rudramadevi
- By Smt. P.B. Kausalya

3) Grammar : Vyakarana Parijatamu
- By Dr. Singupuram Narayana Rao

M.I.L (URDU)

(Compulsory)

FIRST YEAR

Time- 3hrs **Total Classes-80** **F.M-100**

There shall be one paper carrying 100 marks consisting of 3(three) groups and duration of examination will be of 3(three) hours at the college/H.S School Level

Distribution of marks

Group-A **30 Marks**

Q. 1 Objective type questions from all units prose, Poetry and non-detailed

a. Five objective type questions from prose	1 x 5=5 marks
b. Five objective type questions from poetry	1 x 5=5 marks
c. Five objective type questions from Non-detailed	1 x 5 =5 marks
	Total = 15 marks

Grammar

Q.2	a. One word answer five questions	1 x 5 = 5 marks
	b. Very short answer five questions	1 x 5 = 5 marks
	c. Fill up the Blanks five questions	1 x 5= 5 marks
		Total = 15 marks

Group- B **40 marks**

Short Type Answer

Q.3 Answer within two/three sentences

a. Prose- Six questions to be answered out of eight questions	6 x2=12 Marks
b. Poetry- Five questions to be answered out of six questions	5x2= 10 marks

Q.4 Answer with in six sentences.

a. Prose- Three questions to be answered out of four questions 3x3=9marks

b. Ghazaliyat- Three Ashaar explanation to be answered out of four Ashaar 3x3=9marks

Total- 18 marks

Group- C **30 marks**

Q.5

a. Prose : One long answer type question about 150 words with an alternative from prose portion. 7½ Marks

b. Poetry : One long answer type question about 150 words with an alternative from poetry portion 7½ Marks

c. Non detailed- one long answer type question about 150 words with an alternative from non-detailed portion 7½ Marks

d. Letter/Application : one Letter writing/application writing about 100 words. 7 ½ Marks

Books Prescribed :

MEYAR- E- ADAB
Compiled by prof: Suraiya Husain
To be had from Education Book House Aligarh U.P

1. Prose portion : 20 Classes

Portions to be studied :

i. Sair Pahle Darwesh Ki---Mir Amman
ii. Lakhnow Ki Raisana Zindagi KI Ek Jhalak---Sharar
iii. Khutut---Mirza Ghalib
iv. Kalim Daulat A bad mein---Nazir Ahmed
v. Ghalib Ki Shairi--- Hali
vi. Bahaduron ke Karname --- Hasan Nizami
vii. Namak Ka Darogha --- Premchand

2. (a) Poetry Portion :- 2 4

Classes

Portions to be studied

i. Qaid Khane Ki Rat--- Mir Anis

ii. Jogan Aur Chandni Rat--- Mir Hasan

iii. Tazhiq- E- Rozgar--- Sauda

iv. Israf--- Hali

v. Ahd-E-Wafa--- Akhtarul Iman

(b) Ghazaliyat Portion :

First two Ghazals from the following poets

i. Wali, ii. Meer, iii. Ghalib, iv. Momin, v. Atish

3. Non detailed studies :- 16 Classes

Any one of the following books only first half

Of the books in the 1st year

Books prescribed :

i. Taubatun Nasooh :-

By Deputy Nazeer Ahemad

To be had from Maktab – E-Jamiya Ltd

Jamia Nagar New Delhi- 110025

ii. Musaddas Hali

By Altaf Husain Hali

To be had from Educational Book House Aligarh (U.P)

5. Letter writing :

There shall be letter writing/Application writing 5 Classes

6. Grammar 15 Classes

Book Prescribed

Urdu Zoban –o- Quwaid Part- I

By Shafi Ahmed Siddiqui

Portions to be studied :

i. Ism Ki Quismen

ii. Fail Ki Quismen

iii. Sabqueour Laahque

iv. Mutashaba Alfaz

Arts/Sc/Com Stream

SECOND YEAR

Time- 3 hrs **Total Classes- 80** **F.M- 100**

There shall be one paper carrying 100 marks consisting of 3(three) groups and duration of examination will be of 3 (three) hours at the council level.

Distribution of marks

Group-A **30 Marks**

Objective type compulsory

Q1. Objective type question from all units prose, poetry and Non-detailed

a. Five objective type questions from prose	1x5=5 marks
b. Five objective type questions from poetry	1x5=5 marks
c. Five objective type questions from no detailed	1x5=5 marks
	Total:15 marks

GRAMMAR

Q.2

a. One word answer five questions	1x5=5 marks
b. Very short answer five questions	1x5=5 marks
c. Fill up the blanks five questions	1x5= 5 marks
	Total:15 marks

Group-B **40 Marks**

Short Type Answer

Q.3 Answer within two/three sentences.

a. Comprehension of an unseen passage of about 150 words followed by seven questions to be answered out of nine question 7x2=14 marks

b. Prose : Four questions to be answered out of five questions — 4 x 2 =8 marks

Total = 22 marks

Q4. Answer within six sentences

a. Prose : Three questions to be answered out of Four questions — 3x3=9 marks

b. Ghazaliyat : Three Ashaar explanation to be Answered out of four Ashaars — 3x3=9 marks

Total = 18 marks

Group- C **30 Marks**

Long Type Answer

Q.5 a. Prose : One long answer type question about 150 words with an alternative from Prose portions — 7½ marks

b. Poetry : One long answer type question about 150 words with an alternative from Poetry portion. — 7½ marks

c. Non- Detailed : One long answer type question About 150 words with an alternative From non-detailed portion — 7½ marks

d. Essay : One long answer type question about 150 words with three alternatives — 7½ marks

Books prescribed

MEYAR- E-ADAB

Compiled by Prof Suraiya Husain

1. Prose Portion : 20 Classes

Portions to be studied :

i. Ek- Khat : Abul Kalam Azad

ii.Kutte : Patras Bokhari

iii. Nazir Ahmad Ki Kahani : Farhatullah Baig

iv. Acchi Kitab : Abdul Haque

v. Hali : Aale Ahmad Suroor

2. (a) Poetry portion

Portions to be studied :

i. Bazmein Anjum : Iqbal 25 Classes

ii. Kashmir : Chakbast

iii. Badli Ka Chand : Josh Malleeh Abadi

iv. Pairahane Sharar : Sardar Jafri

(b) Ghazaliyat : First two Ghazals of the following poets

i. Hasrat, ii. Faani, iii. Shaad, iv. Firaq, v. Faiz

3. Non detailed studies 15 Classes

Any one of the following books from the remaining

Half portion dis-continued in the 1st year

a. Taubatun Nasooh

By Deputy Nazeer Ahemad

To be had from Maktab- E-Jamiya Ltd

b. Musaddas Hali:

By:- Altaf Husain Hali

To be had from Educational Book House Aligarh (U.P)

4. (a) Essay :

There shall be one general Easy with three alternatives 5 Classes

(b) Comprehension

5. Grammar

Book Prescribed 15 Classes

Urdu Zoban- O – Qawaid Part-1

By Shafi Ahmed Siddiqui

Person to be studies :

i. Tazkir-O-Tanis, ii. Wahid-O-Jama, iii. Mutazad Alfaz, iv. Mahaware

QUESTION PATTERN AND MARK-DIVISION

M.I.L. (SANSKRIT)

1st Year

TIME:03 Hrs **GROUP -A** **FULL MARKS - 100**

Q.1. Multiple Choises : 1 x 15 = 15

MARK-DIVISION : PROSE - 1X3 = 3

: POETRY - 1X2 = 2

: SANDHI - 1X3 = 3

: SANDHIVICCHEDA - 1X3 = 3

: KARAKA - VIBHAKTI - 1X4 = 4

Q.2. One word Answer / Correction / Fill up the Blanks : 1x15 =15

MARK DIVISION :PROSE - 1x2 =2

:POETRY - 1x3 =3

: PRAKRUTI-PRATYAYA - 1x3 =3

: SAMASA - 1X3 =3

: EKAPADIKARANA - 1X4 = 4

(from Stripratya and Samasa)

GROUP -B

Q.3. Short Type Answer (within 2/3 sentences / 12words) : 2x11 = 22

MARK DIVISION : (a) Comprehension - 2x6 = 12 (out of 07Qs.)

(passages from 1to 8 of Samskrtaprabha)

(b) Translation

(from Unseen Sanskrit sentences into Odiya/English) - 2x5 = 10 (out of 07Qs.)

Q.4. Short Type Answer (within 06 sentences / 25words) : 3x6 = 18

MARK DIVISION : (a) PROSE - 3x3 = 09 (out of 04 Qs.)

(b) POETRY - 3x3 = 09 (out of 04 Qs.)

GROUP - C

Q.5. 04 Long Questions out of 06 Qs, $7^{1/2}$ x 4 = 30

(within 08 sentences / 40 words)

a) Letter /Application writing.

b) Long Question (PROSE)

c) Long Question (POETRY)

d) Explanation (PROSE/ POETRY)

e) Translation in to odia/sanskrit from prose/poetry.

f) Precis Writing (OF UNSEEN PASSAGE)

N. B. Answers in Sanskrit are to be written either in Odia Script or in Devanagari Script.

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M.I.L. (SANSKRIT)

FIRST YEAR

There shall be one paper carrying 100 marks.

The duration of Examination will be of three hours.

COURSE STRUCTURE

UNIT	CLASSES REQUIRED	MARKS ALLOTTED
Unit - I		
Prose	**20**	**21 1/2**
Unit - II		
Poetry	**20**	**21 1/2**
Unit - III		
Grammar (Textual & Outside)	**12**	**20**
Unit - IV		
Translation & Comprehension	**18**	**22**
Unit - V Letter/ Application, Expansion of ideas Precis writing	**10**	**15**
	Total 80 Classes	**Total 100**

PORTIONS TO BE STUDIED

Unit - I

Prose- Samskrtaprabha (Gadyabhagah)

[illegible]

The following prose pieces from the above mentioned book are to be studied.

1. [illegible] (Manumatsyakhyanam)
2. चतुरशृगालः (Caturasrgalah)
3. [illegible] (Samskrtekimnasti)
4. [illegible] (JabalahSatyakamah)

UNIT-II

Poetry- Samskrta Prabha (Padya Bhagah)

[illegible]

The following poetry pieces from the above book are to be studied.

1. [illegible] (Subhasitavali)
2. भाति मे भारतम् (Bhati me Bharatam)
3. [illegible] (Vasantah)

Unit - III

(A) Grammar from the text

01. [illegible] (Sandhi)
02. [illegible] Sandhi Viccheda
03. [illegible] Karaka-Vibhakti
04. [illegible] Prakrti Pratyaya

(B) Grammar from outside the text /General

01. [illegible] (Stripratyaya)
02. [illegible] (Samasa)
03. [illegible] (Formation of single word from Stripratyaya and Samasa)

Unit - IV

Translation and Comprehension

A) Comprehension - Sanskrit passage for the comprehension (Passage No. 01 to 08)
of mebmkeÀleÒeYee

B) Translation of unseen Sanskrit sentences into Odia/English

Unit - V

The art of Writing of Letters, Applications, Expansion of Ideas, Textual Explanations, Textual Long Questions and Precis writing.

Books Recommended:

1. **SamskrtaPrabha-mebmkeÀleÒeYee**
   Published by Odisha State Bureau of Textbook Preparation and Production.
2. **Vyakarana-darpanah -** व्याकरण दर्पण:
   Published by Odisha State Bureau of Textbook Preparation and Production.

QUESTION PATTERN AND MARK-DIVISION

M.I.L. (SANSKRIT)

2ND YEAR

TIME:03 Hrs **GROUP - A** **FULL MARKS - 100**

Q.1.MULTIPLE CHOICES : 1 x 15=15

MARK DIVISION : PROSE - 1X3 = 3

: POETRY - 1X2 = 2

: SAMASA - 1X4 = 4 :

: SABDARUPA - 1x3 = 3

: DHATURUPA - 1x3 = 3

Q.2. One word Answer / Correction / Fill up the Blanks : 1x15 =15

MARK DIVISION : PROSE - 1x2 =2

: POETRY - 1x3 =3

: SANDHI - 1X2 = 2

: SANDHIVICCHEDA - 1x2 =2

: KARAKA VIBHAKTI - 1X3 = 3

: STRIPRATYAYA - 1X3 = 3

GROUP-B

Q.3. Short Type Answer (within 2/3 sentences / 12words) : 2x11 = 22

MARK DIVISION : (a) Comprehension - 2x6 = 12 (out of 07Qs.)
(passages from 9 to16 of Samskrtaprabha)

: (b) Translation - 2x5 = 10 (out of 07Qs.)
(from Odiya/English into Sanskrit)

Q.4. Short Type Answer (within 06 sentences / 25words) : 3 x 6 = 18

MARK DIVISION : (a) PROSE - 3 x 3 = 09 (out of 04 Qs.)

(b) POETRY - 3 x 3 = 09 (out of 04 Qs.)

GROUP - C

Q.5. 04 Long Questions out of 06 Qs, $7^{1/2}$ x 4 = 30

(within 08 sentences / 40 words)

a) Letter /Application writing.

b) Long Question (PROSE)

c) Long Question (POETRY)

d) Explanation (PROSE/ POETRY)

e) Translation in to odia/sanskrit from prose/poetry.

f) Precis writing (OF UNSEEN PASSAGE)

N.B. Answers in Sanskrit are to be written either in Odia Script or in Devanagari Script.

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M.I.L. (SANSKRIT)

SECOND YEAR

There shall be one paper carrying 100 marks.

The duration of Examination will be of three hours

COURSE STRUCTURE

UNIT	CLASSES REQUIRED	MARKS ALLOTTED
Unit - I		
Prose	**20**	**21 1/2**
Unit - II		
Poetry	**20**	**21 1/2**
Unit - III		
Grammar (Textual & Outside)	**12**	**20**
Unit - IV		
Translation & Comprehension	**18**	**22**
Unit - V	**10**	**15**
Letter/ Application		
Expansion of ideas		
Precis writing		
	Total 80 Classes	**Total 100 Marks**

PORTIONS TO BE STUDIED

Unit - I

Prose- Samskrtaprabha (Gadyabhagah)

[illegible]

The following prose pieces from the above mentioned book are to be studied.

1. [illegible] (Kapotalubdhakakatha)
2. सुश्रुतस्य यन्त्रकर्मशस्त्रकर्माणि (Susrutasya Yantrakarma sastrakarmani)
3. [illegible] (Gunigunahinavivekah)
4. [illegible] (Ramatapovanabhigamanam)

UNIT-II

Poetry- Samskrtaprabha (Padyabhagah)

[illegible]

The following poetry pieces from the above book are to be studied.

1. [illegible] (Dasavatarastuth)
2. [illegible] (Gitasaurabhavam).
3. [illegible] (Raghuvamsam)

Unit - III

(A) Grammar from the text

01.	[illegible]	Karaka-Vibhakti
02.	[illegible]	Sandhi
03.	[illegible]	Sandhi Viccheda

(B) Grammar from outside the text/General

01. Meyo¤He–Sabdarupa- (vej, HeÀue, uelee, ceoefve, ceefle, Jeeefj, veeer, efHele=, ceele=, ieÓlee, ceveme, Deelceve, leo, efkeÀce, Foce, Dence, ³eg<ceo, efÜ, ef$e, ®elegj)

02. Oeelegª¤He–Dhaturupa- (Yet, ieceed, Hebo, keÀ, Deme, ueYed, Hetpe)

03. meceeme –(Samasa)

04 ðeerÒel³e³e –(Stripratyaya)

Unit - IV

Translation and Comprehension

A)Comprehension - Sanskrit passages for the comprehension (Passage No. 09 to 16) of **mebmke=ÀleÒeYee**

B) Translation of Odia/English sentences into Sanskrit.

Unit - V

The art of Writing of Letters, Applications, Expansion of Ideas, Textual Explanations, Textual Long Questions and Precis writing.

<u>Books Recommenced:</u>

1. **Samskrta Prabha – mebmke=ÀleÒeYee**

   Published by Odisha State Bureau of Textbook Preparation and Production.

2. **Vyakarana-darpanah -** व्याकरणदर्पण:

   Published by Odisha State Bureau of Textbook Preparation and Production.

ALTERNATIVE ENGLISH

1. Introduction : The course is meant for the students

(a) who opt to study English in lieu of a Modem Indian Language, and

(b) who seek-to develop a high level of competence in English.

It is assumed that the students who offer to study this course have high motivation and competence in English. Hence, it aims at building up on their previous learning and their acquisition of skills in compulsory English course which they are exposed to simultaneously.

2. Objectives : By the end of the course a student should be able to

(a) transact real-life business in English, and

(b) appreciate, evaluate and enjoy different types of writing in English

By the end of the Higher Secondary Course in Alternative English, the learners are expected to acquire the language skills specified below :

3.1. Reading (Non-fictional prose) :

(a) To make predictions and guesses while reading a prose text

(b) To understand relations between the parts of a reading text and recognize the indicators in discourse.

(c) To understand the writer's intention/attitude, to discriminate between facts and opinions, to recognize the writer's bias, if any, and to assess the communicative value of a given text.

(d) To identify the structure of a text, such as descriptive sequence, chronological sequence, cause-arid-effect chain, argumentative and logical organization, etc.

(e) To compare and contrast two texts on similar themes

(f) To use reference skills to select a suitable text for reading.

(g) To use the title, blurb, contents and index of a book in order to form an overall idea of what the book is about and of whether it will be relevant reading with reference to a particular topic.

3.2. Reading (Poetry) :

(a) To recognize the structure of a poem and to appreciate the themes and ideas presented therein.

(b) To recognize, identify and interpret poetic structure in a given poem.

(c) To recognize and appreciate the effects of different poetic devices like simile / metaphor / symbol / personification / irony / alliteration / assonance, etc.

3.3. Reading (short stories, one-act plays) The students are expected to develop in them the capacity

(a) To comprehend the plot and characters of a given short story/play, and

(b) To interpret the themes and points of view contained in a given story/play.

4.1. Writing : The students will be able

(a) to formulate ideas for compositions, to brainstorm and organize ideas, to write and revise their writing on common themes/situations for given purpose.

(b) to identify grammatical errors and to correct them in their own writing or in peer writing.

(c) To design and write a brochure or pamphlet

(d) To write the dialogues of a face-to-face/telephonic conversation.

4.2. Creative Writing : The students are expected to develop in them the ability

(a) To add a suitable beginning/ending/title to a given poem/story

(b) To reconstruct a story from a given set of questions/fillers/outlines.

(c) To rewrite a poem/short story as a different from of discourse, i.e. a page of a diary, a newspaper article or a script for a play etc.

4. Grammar and Usage : Points relating to Grammar and usage will be mainly discourse-based. These points are discussed in 'Approaches to English Book I' and in Reference Books for Grammar mentioned under 'Instructional Materials'. They are related to the following broad topics :

i) Tense and Aspect

ii) Modals

iii) Non-finite Verb forms

iv) The Passive

v) Prepositions

vi) Phrasal Verbs

vii) Clause-types

viii) Linking Devices

ix) Word Order and Emphasis

5. Instructional Materials :

(a) Approaches to English, Book-I

(b) Approaches to English, Book-II

Published by the Orissa State Bureau of Textbook Preparation and Production, Pustak Bhavan, Bhubaneswar.

(c) Reference Books for Grammar and Usage :

(i) A University Grammar of English (Quirk, Greenbaum et al)

(ii) English Grammar Practice (Bijoy Kumar Bal)

FIRST YEAR

A. APPROACHES TO ENGLISH, BOOK-I

Prose

Units to be studied :

i. The Adventure of Learning

ii. Men and Women

iii. Modern Living

iv. Food for Thought

B. APPROACHES TO ENGLISH, BOOK -II

Poetry

Units to be studied :

i. Ecology (A.K.Ramanujan)

ii. Dog's Death (John Updike)

iii. The Fog (W.H.Davies)

iv. Girl Lithe and Tawny (Pablo Neruda)

v. Ballad of the Landlord (Langston Hughes)

Short Stories

Units to be studied :

xi. The Rainbow-Bird (Vance Palmer)

xii. The Eyes Have it (Ruskin Bond)

xiii. The little Wife (William March)

One-Act Plays

Units to be studies :

xvii. Mother's Day (J.B. Priestley)

xviii. The Unexpected (Ella Adkins)

C. GRAMMAR & USAGE

i. Tense and Aspect

ii. Modals

iii. Non-finite verb forms

iv. The passive

v. Prepositions and Phrasal Verbs

SECOND YEAR

A. APPROACHES TO ENGLISH, BOOK-I

Units to be studied

vi. The Wonder World of Science

vii. Our Environment

viii. The World of Business

ix. The Changing World

B. APPROACHES TO ENGLISH, BOOK-II

Poetry

Units to be studied :

vi. Indian Children Speak (Juanita Bell)

vii. The Goat Paths (James Stephen)

viii. Of a Questionable Conviction (Jayanta Mahapatra)

ix. Mirror (Sylvia Plath)

x. Toads (Philip Larkin).

Short Stories

Units to be studied :

xiv. The Happy Man (W.S.Maugham)

xv. The Tree (Manoj Das)

xvi. The Watch Man (R.K.Narayan)

One Act Plays

Units to be studies

xix. The Hour of Truth (Percival Wilde)

C. GRAMMAR & USAGE

i. Revision of 'Tense and Aspect'

ii. Revision of Prepositions and Phrasal Verbs

iii. Clause-types

iv. Linking Devices

v. Word Order and Emphasis

Scheme of Evaluation

There will be a college examination in Alternatjve English at the end of the First Year. This will be Alternative English Paper -I carrying 100 marks. The final examination to be conducted by CHSE at the end of the second year of the course will consist of one written paper of Alternative English carrying 100 marks. The paper shall test the student's proficiency in English with respect to correctness, appropriacy, tone and style.

Alternative English (1st Year) - (To be evaluated at the college level)

1. Reading Comprehension :

(a) A prescribed prose piece or extract (5 questions - including inferential questions-are to be answered)

(b) A prescribed poem/extract (5 questions including inferential questions and those on poetic devices, figures of speech, mood, tone and style etc.)

(c) A prescribed story / one-act play or its extract (5 questions including inferential questions and those on literary devices, tone etc.)

(d) An unseen passage of at least 200 words (5 questions including Inferential ones)

2. Reading related skills.

(a) Guided note making based on the passage 1 (d)

(b) Cohesive devices

3. Writing skills.

(a) Summarising an unknown passage as given in 1 (d) with caption

(b) Reconstruct a story from a given set of questions/fillers/outlines or completion of a story

(c) Essay writing (including brainstorming, organizing, outlining, writing first draft and revising)

4. Grammar and usage (in context) (3 questions on the prescribed grammar units)

Alternative English (2nd year) To be evaluated at CHSE level

1. Reading Comprehension.

(a) A prescribed prose piece or extract (5 questions including inferential questions are to be answered).

(b) A prescribed poem / extract (5 questions including inferential questions and those on poetic devices, figures of speech, mode, tone and style etc.)

(c) A prescribed story / one-act play or its extract (5 questions including Inferential questions and those on literary devices, tone etc.)

(d) An unseen passage of at least 200 words (5 questions including inferential ones)

2. Reading related skills.

Unguided note making (based on the passage given in 1 (d).

3. Writing skills.

(a) Designing and writing a brochure / pamphlet

(b) Writing dialogues of a face-to-face / telephonic conversation.

(c) Rewriting a poem/short story as a different form of discourse i.e. a page of a diary, a newspaper report/article or a script for a play etc.

(d) Adding a suitable beginning/ending/title to a given poem/story.

4. Grammar and usage (in context)
(3 questions on the prescribed grammar units including modified cloze tests).

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ENVIRONMENTAL EDUCATION

(Compulsory)

The Environmental Education (EE) is incorporated in the New Syllabus of Higher Secondary (+2) students of all streams (Science, Arts & Commerce) from 2006 (admission batch). The theory course shall be taught in 40 periods.

The syllabus is compulsory for all students. To reduce the work-load of students EE will be taught in XI class only. The syllabus shall be of 100 marks of which 70 marks assigned to theory paper and 30 marks for project work.

Questions for theory paper shall be prepared by the Council and examination will be held on a stipulated date fixed by the Council.

The questions for theory paper will be prepared as per the norms of Council as done for all other subjects, 40 marks for short (which also includes objectives) and 30 marks for long questions.

Students are required to answer three long questions one from each unit. Each unit will have 2 questions with internal choice. The short questions (covering all units) will be compulsory.

Each students has to submit a project work positively to the Principals of the respective colleges before Annual Examination.

There shall be 10 project work titles specified in the course and students are free to choose any one of them. A group of teachers will be assigned to guide them. The project shall be evaluated in the respective colleges. The best project (as will be decided by the Principal) may be sent to Council for consideration for award of a special prize.

The grade secured (taking both the theory and project marks) will be reflected in the mark sheet and pass certificate.

(Above 70% - Gr. A^+, above 60% - Gr. A, above 50% - Gr. B, above 35% - Gr. C and below 35% - Gr. D)

THEORY (70 Marks)

Unit - I

(A) Man and Environment 8 Periods

Atmosphere, Lithosphere, Hydrosphere and Biosphere- Human being as a rational social partner in environmental action - Impact of human activities on environment -Environmental Problems of urban and rural areas- Stress on civic amenities, supply of water, electricity, transport and health services.

(B) Natural Resources : 6 Periods

Land, water, forest as primary natural resources- Fresh water and Marine resources- Natural resources of Orissa -Concept of Biodiversity and its conservation. Renewable and non- renewable natural resources, Conventional and non- conventional energy.

Unit - II

Environmental Pollution : 6 Periods

Types of pollution and pollutants Causes, effects and control of air pollution, water pollution; soil pollution and noise pollution, Green house effect, Global Warming, Eutrophication, Ozone layer depletion.

Unit - III

(A) Environmental Management : 6 Periods

Scope of Environmental Management- Management of solid, liquid and gaseous wastes - Resource Management- disaster Management (flood, cyclone and earthquake) -Concept of sustainable development- Management of agricultural produce.

(B) Environmental Laws : 5 Periods

Constitutional Provisions -Major provisions of Environmental Laws and Pollution Control Laws with particular reference to the Water Act; 1974, the Air Act, 1981, the E(P) Act 1986, CPCB and SPCB- Central and State Pollution Control Boards.

PROJECTS

5 Periods F. M. : 30

1. To study the changes that have taken place in the given land area of a city/Village/locality/ market during the last five years in respect of at least five parameters like number of houses,

residents and families, food habits, number of household goods in a family, consumption of water, electricity and fuel including that for personal vehicles by a family, sources of noise (public address systems being used, television, radio and vehicles on the road), common facilities like number of schools, hospitals, shops, theatres, public conveyance, public utilities, public transport, number of factories, industries and/or the facilities for production and processing of goods, loss of water bodies, types and quantity of wastes, their disposal and treatment facilities with a view to discuss the patterns of changes and impact on the environment and quality of life. One specific project on these aspects may be to study the changes that have taken place in a given land area during the last five years in respect of the number of houses, residents and families and to prepare a report on the effects on civic amenities like availability of water, electricity and fuel; the drainage system, disposal of wastes Including night soil.

2. To study the environmental profile of a town/ locality/village in respect of population density, green cover, educational level of residents, social problems and sources of pollution and their effect on air, water and soil.

3. To collect data on monthly consumption of electricity and fuel from at least five families, any two commercial establishments and four public utilities in a given locality. To plan strategies for educating consumers to economise on the consumption of electricity and fuel by reducing their over-use, misuse and improper use.

4. To study, for a period of one month, the status of sanitary conditions and methods of waste disposal of a given locality vis-a-vis the role of Panchayat, Municipality or Corporation and to prepare an action plan for making the conditions more environment friendly.

5. To investigate the impact of an industry or a large manufacturing unit on the local environment. The parameters could be land use, the ratio of the covered area and the open space, the raw materials used for production, inputs like electricity and water, the types of waste generated and the modes of waste disposal, use of environment friendly and efficient technology, types of pollutants emitted or discharged, the average health status of the employees and residents in the area.

6. To study the impact of changes in agricultural practices or animal husbandry including poultry, piggery, fishery and apiculture over a period of time on the local environment of a given area or village. The components for analysis may include: types of crops, land area under cultivation,

mechanization, use of electricity, mode of irrigation and agrochemicals, agro-waste and their disposal, types of animal breed and their feed, types of shelter and health care, methods of preservation and processing of products and animal wastes and their disposal. To suggest an action plan for modifying the prevailing practices so as to make them environment friendly and sustainable.

7. To collect samples of water from different sources and study their physical characteristics like turbidity, colour, odour; the measure of pH, the nature of suspended and dissolved impurities and pollutants, the presence of toxic materials like mercury, lead, arsenic, fluorine and the presence of living organisms. For testing the presence of toxic materials and living organisms the help of a local laboratory or institution may be taken, if available. To identify the most polluted sample of water and locate the sources of its pollution. To devise an action plan for mobilising public opinion for checking the pollution.

8. To study the practices followed in the region for storage, preservation, transportation and processing of perishable or non- perishable farm products and to assess the extent of their wastage due to faulty practices.

9. To prepare a status report on the prevalence of child labour in a given area through simple surveys on children engaged as domestic help and as workers in farms, commercial establishments and manufacturing units. The survey may be in respect of age group, education, wages, working hours, working conditions, safety in work place, health, handling hazardous materials and the like. Units dealing with hazardous materials and processes may be identified and an action plan for mobilising public opinion against the practice of child labour may be prepared.

10. To conduct a survey of plants in a locality and to collect information about their cultural, economic and medicinal values from the local people and the available literature. To prepare an action plan for their propagation.

Book Prescribed :

Bureau's Higher Secondary (+2) Environmental Education - Orissa State Bureau of Textbook Preparation & Production, Bhubaneswar.

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YOGA (Theory)

+2 1st year

Full Marks - 50 Time 2 hrs.

Unit - I 10 marks

CONCEPT YOGA

Meaning. Definition and Scope of yoga, Importance and aim of yoga for the students, Misconception of Yoga

Yoga and Spirituality

Unit - II 10 marks

BASIC PRINCIPLES OF YOGA PRACTICE

Place, Time, Age, Diet, Dress, Do's and Don'ts Power of Silence

Unit - III 10 marks

BRANCHES OF YOGA

Karma Yoga, Bhakti Yoga, Raja Yoga, Jnana Yoga

Yoga in Srimad Bhagavat Gita

Unit - IV 10 marks

CONCEPT OF ASTHANGA YOGA

Yama, niyama, asana, pranayama, pratyahara, dharana, dhyana and samadhi

Unit - V 10 marks

YOGA AND PERSONALITY DEVELOPMENT

Meaning, Definition of Personality

Dimension of Personality: physical, mental, emotional, intellectual and spiritual. Personality Development in relation to external world civic, social, patriotic and global consciousness. Concept of Personality According to swami Vivekananda and Sri Aurobindo.

YOGA (Practical)

+2 2nd year

Full Marks - 50 Time 2 hrs.

Unit - I 20 marks

ASANA

PRILIMINARY PRACTICES : Greeva Sanchalana, skandha chakra (shoulder rotation), purna, titali asana (full butterfly), marjari asana (car stretch pose), Surya Namaskara

STANDING POSTURE : Tadasana, tiryak tadasana, katichakrasana pada-hastasana, ardha chakrasana, ardhakati chakrasana, ekapada pranasmasana, garudasana, natarajasana.

SITTING POSTURE : padmasana janusirasana, paschimottanasana, supta vajrasana, shashankasana, ustrasana, ardhamatsyendrasana.

PRONE LYING POSTURE : shalabhasana, bhujangasana, dhanurasana.

SUPINE POSTURE : uttanapadasana, supta pawanamuktasana, naukasana, halasana, sarvangasana, matsyasana, chakrasana.

Unit-II (10 marks)

RELAXATION : savasana, yoganidra

Unit - III (10 marks)

PRANAYAMA : Priliminary practices: abdominal, thoracic, clavicular and full yogic breathing kapalabhati, nadisodhana, bhramari

seetali/seetkari

Unit - IV and Unit - V (10 marks)

MEDITATION : Antarmouna - sensorial awareness : (sound, touch, vison, smell, taste), breath awareness, awareness of the spontaneous thought process.

Unit-V

KRIYA : Trataka (internal and external)

For +2 1st year 50 marks theory examination and For +2 2nd year 50 marks practical examination but in 1st year and 2nd year students will learn practical

The grade secured taking together both the theory and Project/Practical marks will be refelected in the Marks sheet and the pass certificate of the Council.

Grade A^+ = 70% above, Grade B^+ = 60% and Grade B = 50% above, Grade C = 35% and Grade D = before 35%

Books Prescribed : An Introduction to Yoga, ଯୋଗ ପରିଚୟ

Published by Orissa State Bureau of Textbook Preparation and Production

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BASIC COMPUTER EDUCATION

+2 1st Year

UNIT-I

Computer Fundamentals : Necessity and uses of computer, what is computer?, Computer as a ystem, problem and problem solving technique, Important terminology, Input-Output levices, types of computer, (Digital, Analog, Hybrid, Super computer, Main Frame, Mini, JC, Note Book, and Laptop).Generation of Computer, Computer Memory, (Main, Secondary, '/irtual. Buffer, Cache,) Computer Languages and its types.

8 Hours

UNIT-II

Operating System: types, software, Dos and Windows : Fundamentals and Commands , Security and Anti-virus

Introduction to MS_OFFICE:

MS- WORD: Creating a File, setting and typing text, page formatting, editing, printing, saving the files, creating Folders , Insertion tables and objects, Bulleting, Page Numbering, spell check, indenting , paragraph setting and mail merge, CD writing.

MS-EXCEL: Spread sheet and its uses , an introduction, formatting work sheet, setting columns/ Rows, range, Format, protect, sorting, types of graphs, functions and formula, printing text, copying and saving the document.

MS-POWER POINT : Features, Uses, Menus, Toolbars, creating a presentation through auto context wizard, templates, manual slides show, saving, deleting, opening a presentation, Editing.

MS-ACCESS: Data base, data base Management system, RDBMS, advantages and limitations of MS-Access, parts, tables, integrity constraints, relationship and designing tables.

l5hours

UNIT-III

INTERNET AND COMPUTER SECURITY:

Introduction to Internet, net browsing, Emails, Networking and its types, topology, computer crime, components required for internet, saving and printing the web files.

APLLICATIONS: in Education, Medical Science, Business, Entertainment, Social services and Research etc.

7 hours

For +2 1st year 50 marks theory examination and 50 marks practical examination.

TOTAL HOURS: 30 (THEORY) AND 10 HOURS (PRACTICAL).

PRACTICALS :

DOS, Windows, MS-Office, web page, browsing, sending and creating a mail

The grade secured taking together both the theory and Project/Practical marks will be refelected in the Marks sheet and the pass certificate of the Council.

Grade A^+ = 70% above, Grade A = 60% and Grade B = 50% above, Grade C = 35% above and Grade D = below 35%

BASIC FOUNDATION COURSE - 1

1st year Physics Theory

Total Periods - 68
Time : 2-1/2 hrs.
Full Marks - 50

UNIT-I

1. **Units and Dimensions**: S.I. system of Units, dimension of a physical quantity, dimensional analysis. (4 Periods)
2. **Scalars and Vectors**: The concept of vectors and scalars, unit vector, components of a vector along the co-ordinate axes, addition and subtraction of vectors, triangle, parallelogram and polygon law method of vectgor addition, dot and cross product of two vectors. (8 periods)
3. **Kinematics of a Particle** :Average and instantaneous speed and velocity, average and Instanatneous acceleraction, velocity as time rate of displacement, acceleration as time rate of velocity. Equation of linear motion for uniformly accelerated bodies.(4 periods)
4. **Force, Work, Energy & Power :** Newton's laws of motion, inertia of rest and inertia of motion, equilibrium of forces, conservation of linear momentum, impulse of force, impulse momentum theorem. Work done by a consant force, kinetic energy, Potential energy, conservation of energy, power. (6 periods)

UNIT-II

1. **Properties of matter :** Elasticity, strain and stress, elastic limit, Hooke's Law, Young's Modulus, rigidity Modulus, Poisson's Ratio. Surface tension, angle of contact, capillary rise. (7 periods)
2. **Circular Motion :** Uniform circular motion, expression for centripetal acceleration (without derivation), banking of tracks. (4 periods)
3. **Gravitational Force :** Newton's law of gravitation, accelration due to gravity, its variation with altitude & depth,geostationary satellite,escape velocity. (6 periods)
4. **Oscillatory Motions** : Time period and frequency, simple harmonic motion, displacement, amplitude and phase, expression for velocity and acceleration, kinetic energy and potential energy of a particle executing SHM. (7 periods)

UNIT-III

1. **Heat Phenomena** : Concept of Heat and Temperature, scale of temperature (Celsius, Fahrenheit, Kelvin). Thermal expansion of solids, relations between co-efficients of expansion. Definitions of Mechanical equivalent of heat, heat capacity, specific heat, water equivalent, change of phase, latent heat (No experiemtnal determination)

   (10 periods)

2. **Heat Transfer:** Transfer of heat, conduction, convection and radiation, thermal conductivity of solids, its determiantion by Searle's method. (4 periods)

3. **Kinetic Theory of Gases:** Postulates of kinetic theory of gases. R.M.S. and mean speed, derivation of the expression for pressure of an ideal gas, kinetic interpretation of temperature, degrees of freedom of mono-atomic and diatomic gases, law of equipartition of energy (Statement only). (8 periods).

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BASIC FOUNDATION COURSE - 1

2nd year Physics Theory

Total Periods - 68

Time : 2-1/2 hrs.

Full Marks - 50

UNIT-I

1. **Electric charge, electric field and potential** : Frictional electricity, electric charge and its conservation, Columb's law, force between two point charges, di-electric permittivity, electric field, field strength E, electric field due to point charge, electric dipole, electric field due to a dipole at (i) an axial point (ii) equatorial point.

   Electrostatic potential difference, electrical potential due to a point charge, electrical potential due to dipole, (i) at an axial point and (ii) at an equatorial point.(7 periods)

2. **Capacitance** : Capacitance and capacitors, capacitance of an isolated sphere, capacitors in series and in parallel. (5 periods)

3. **Electric Current :** Electric current, Ohm's law, conductance, conductivity, resistance and resistivity, emf, relation between emf and potential difference, variation of resistance with temperature, resistances in series and in parallel.

   Heating effect of electric current, statement of Joule's law, electric power.

   (7 periods)

4. **Magnetic effect of electric current :** Force on a current carrying conductor in a uniform magnetic field, magnetic induction B, Biot-savart's law, magnetic field at the centre of a current carrying circular loop. (4 periods).

UNIT - II

1. **Electro-Magnetic Induction :** Induced emf, Faraday's law of electromagnetic induction, Lenz's law, self and mutual inductance, voltage induced in a rotating coil in a uniform magnetic field. (5 periods)

2. **Alternating Current :** Alternating current, peak and RMS value of alternating current/voltage, reactance, A.C. through circuits containing resistance only, capacitance only & inductance only (expressions for current without any derivation). (5 periods)

3. **Solids and Semiconductors :** Energy band in solids (qualitative ideas only), difference between metals, insulators and semic conductors on the basis of band theory, intrinsic and extrinsic semiconductors, P-type and N-type semiconductor, p-n junction and its charateristics.

   One p-n junction used as a half wave rectifier and two p-n junctions used as full wave rectifier. Junction transistors (pnp and npn), transistor characteristics CE and CB mode. (8 periods)

4. **Digital Electronics :** Decimal and binary numbers, conversion, logic gates:- OR, AND, NOT, NAND and NOR gates (Symbol, use and truth table). (5 periods)

UNIT-III

1. **Reflection and Refraction of light :** reflection by spherical mirror, mirror equation (derivation), laws of refraction, refractive index and its relation with velocityof light (formula only), critical angle, total internal reflection, u-v relation for a lens (without derivation), power of lens. (6 periods)

2. **Refraction and deviation produced by prism :** Minimum deviation and refractive index of material of a prism, simple magnifying glass. (4 periods)

3. **Atomic Physics :** Rutherford's model of atom and its limitations, Bohr's model of hydrogen atom, derivation of expression for radius and energy of hydrogen atom in the nth state, explanation of hydrogen spectra, photoelectric effect. Einstein's photoelectric equation, threshold frequency, work function, application of photo-electric effects.

   Atomic nucleus, its composition, mass defect, statement of mass-energy equivalence relation, binding energy. (12 periods)

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BASIC FOUNDATION COURSE-I
CHEMISTRY THEORY
(For First Year) TOTAL PERIOD-68

Time - 2.30 hrs

F. M. - 50

Unit - I

(i) Basic Concepts in Chemistry :

Atoms molecules, valency, radicals, atomic mass, molecular mass, equivalent massAvogadro's Hypothesis and its applications, Mole concept, units of concentration, Stochiometric calculations.

(2 periods)

(ii) Different States of Matter :

Gaseous State : Postalates of Kinetic theory of gases, derivation of Kinetic gas equation and gas laws from kinetic gas equation, ideal and real gases, van der Waal's equation; average, root mean square and most probable velocities, preliminary idea about distribution of molecular velocity.

(4 periods)

(iii) *Liquid State and Solutions :*

Raoult's law, osmosis, molecular mass determination from lowering of vapour pressure, elevation of boiling point, depression of freezing point and osmotic pressure. (4 periods)

(iv) *Colloidal State and Surface Chemistry :* Types of colloids, preparation, purification, properties and uses of colloids; types of adsorption and its applications.

(v) Structure of the atom:

Dual nature of matter, Heisenberg's uncertainly principle, quantum numbers, shapes of s, p, d- orbitals, Pauli exclusion principle, Aufbau principle, Hund's rule, electronic configuration of atoms upto atomic number 30.

(6 periods)

(vi) Periodic classification:

Periodicity in properties such as atomic and ionic radii, ionisation potential, electron affinity, electronegativity and oxidation states. (4 periods)

UNIT - II

(i) Chemical Bonding: **30 Periods**

Polarity in covalent molecules, hybridisation (sp, sp^2 and sp^3), VSEPR theory, shapes of molecules (linear, angular, planar, pyramidal and tetrahedral) σ and π bond. Hydrogen bond.

(ii) Chemical reactions: (4 periods)

Types of chemical reaction, redox reaction, equivalent mass of oxidants and reductants ($KMnO_4$ and $K_2Cr_2O_7$ in acid medium, oxalate ion and thiosulphate ion), balancing redox reactions by oxidation number and ion-electron methods, neutralisation reaction, volumetric analysis.

(iii) Hydrogen : (2periods)

Preparation, properties and uses of heavy water and hydrogen peroxide, strength of H_2O_2.

(iv) Principles & Process of extraction of metals :

Occurrence of metals, metallurgy, Ores and minerals, concentration, flux, slag, calcination, roasting, smelting, various reduction methods used for extraction of metals (carbon reduction, aluminothermic process, electrolytic reduction and self reduction) and refining. (3 periods)

(v) S-block elements : (2 periods)

Alkali and alkaline earth metals:

General characteristics of the alkali and alkaline earth group metals.

(vi) P-block of elements : (2 periods)

(a) *Group 13 elements :*

General characteristics of group 13 elements. (3 periods)

(b) *Group 14 and 15 elements :*

General characteristics of group 14 and 15 elements.

UNIT - III

(i) Organic chemistry :

(i) *Basic principles:* Tetravalency of carbon, shapes of simple organic molecules (methane, ethane, ethene and ethyne) functional groups, nomenclature by IUPAC system of organic compound; inductive effect, resonance, fission of covalent bond, electrophile, nucleophile, types of organic reactions (addition, elimination and substitution reaction - examples only). (5 periods)

(ii) *Isomerism :*

Concept, types, structural (chain, position, functional, metamerism and tautomerism), stereoisomerism; geometrical and optical, defination and examples only.

(2 periods)

(iii) Hydrocarbons :

Alkanes, General formula, methods of preparation; reduction of alkenes and alkynes, decarboxylation of carboxylic acid, Wurtz reaction and Kolbe's synthesis, general properties; physical, chemical: substitution (halogenation and nitration), cracking.

(3periods)

(iv) *Alkenes:*

General formula, methods of preparation; dehydrohalogenation of alkyl halides and dehydration of alcohols, electrolysis of salt of dibasic acids, properties; physical, chemical: addition with H_2, X_2, HX (Markownikoff's rule and peroxide effect), HOX, H_2SO_4, ozonolysis, polymerisation. (3 periods)

(iv) *Alkynes:*

General formula, methods of preparation: dehydrohalogenation of vicinal and geminal dihalides, dehalogenation of tetrahalides, electrolysis of salt of dibasic acids, preparation of acetylene from iodoform and calcium carbide, properties: physical, chemical: acidic nature of acetylene and terminal alkynes, addition reaction with H_2, HX, HOX, H_2O and ozonolysis, reaction with ammonical Cu_2Cl_2 solution and $AgNO_3$ solution and uses of acetylene. (3 periods)

(v) Organometallic compounds:

Organomagnesium compounds: Grignard reagent -preparation from alkyl halide, its use in the preparation of alkanes, alcohols, aldehydes, ketones and monocarboxylic acids. (3 periods)

(vi) Alcohols:

Classification as primary, secondary and tertiary alcohols, general methods of preparation from alkylhalides, esters, aldehydes, ketones, and Grignard reagents, properties: physical, chemical: reaction with strongly electropositive metals, organic acids, inorganic acids, PCl_5, distinction between primary, secondary and tertiary alcohols (3 periods)

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PAPER - II

Time- 2.30 Hrs.

Full Mark -50

UNIT - I

(i) *Energetics :*

Exothermic and endothermic reactions, internal energy and enthalpy, heat of formation, combustion and reaction, Hess's law, bond energy.

(3 periods)

(ii) Chemical Equilibria :

Law of mass action, equilibrium constants K_p, K_c, and K_x, relationship between them. Le-chatelier principle and its application to Synthesis of Ammonia. (4 periods)

(iii) Ionic Equilibria :

Concept of acids, bases and salts, ionic product of water, hydrolysis of salts, pH, buffer solution, Henderson equation, Common Ion effect solubilityproduct and application in qualitative analysis. (5 periods)

(iv) *Electrochemistry :*

Electrolytes and nonelectrolytes, electrolysis, Faraday's laws, specific, equivalent and molar conductance, Kohlrausch law and its applications, Galvanic cells, cell reactions, Nernst equation, standard electrode potential, electrochemical series, e.m.f. of simple cells. (7 periods)

(v) *Chemical Kinetics:*

Factors affecting rate, order of reactions and molecularity, kinetics of zero and first order reactions, half life period, Activation energy.

(4 periods)

UNIT - II

(i) *Nuclear Chemistry :*

Properties of alpha, beta and gamma rays, group displacement law, kinetics of radioactive decay, half life period, stability of nuclei with respect to neutron/proton ratio, Carbondating, mass energy conversions, artificial radioactivity induced by alpha particles, nuclear fission

and fusion. (5 periods)

(ii) *p-block elements :*

(a) General characteristics of Group -16 elements Genral Characteristics of Family. Preparation, Properties and uses of ozone.

(3 periods)

(b) General characteristics of Group 17 elements.General Characteristics of halogen family.

(2 periods)

(c) Position of Group 18 elements in the periodic table, properties and uses of noble gases, preparation, properties and structure of XeF_2, XeF_4 and XeF_6. (3 periods)

(iii) Transition metals: General characteristics, principle of extraction, properties and uses of Cu and Fe, preparation, properties and uses of oxides, chlorides and nitrates of Cu and Fe. (6 periods)

(iv) *Co-ordination compounds and organometallics :*

Werner's theory of co-ordination compounds, nomenclature, isomerism in coordination compounds, elementary ideas and classification of organometallic compound with examples.

(4 periods)

UNIT - III :

(i) *Aldehydes and Ketones :*

Oxidation and dehydrogenation of alcohols, dry distillation of calcium salt of monocarboxylic acids, from acid chlorides, properties:- Physical, Chemical; reaction with HCN, $NaHSO_3$, hydroxylamine, phenylhydrazine, Tollen's reagent, Fehling's solution, aldol condensation, Cannizzaro's reaction, and iodoform reaction. (4 periods)

(ii) *Monocarboxylic acids :*

General methods of preparation: Oxidation of primary alcohols and aldehydes, hydrolysis of cyanides and esters, carboxylation of Grignard's reagents, Properties: Physical, Chemical; reaction with metals, NH_3, alcohol, sodalime, reaction of formic acid with Tollen's reagent. (2 periods)

(iii) Amides: Preparation by heating of ammonium salt, reactions with P_2O_5, HNO_2 and Hofmann's bromamide reaction. (2 periods)

(iv) Acid Chlorides: Preparation from acids by PCl_5 and thionyl chloride, reactions with alcohols and sodium salt of acids. (2 periods)

(v) Aliphatic amines : Types of amines, basic nature of amines, preparation of primary amines only, reduction of nitroalkanes, cyanides, Hofmann's bromamide reaction, Physical, and Chemical properties. (2 periods)

(vi) *Aromatic compounds :*

Aromatic hydrocarbons. concept of aromaticity (Huckel's rule), graphic formula of benzene, preparation of benzene from sodium benzoate, properties - electrophilic substitution reaction halogenation, nitration, sulphonation and Friedel-Craft reaction, addition reaction, oxidation and ozonolysis, directive influence of substituents. (5 periods)

(vii) Phenols: Preparation from sodium benzene sulphonate, properties: acidic character, electrophilic substitution reaction (nitration, halogenation; sulphonation, Reimer - Tiemann reaction). (2 periods)

(viii) Polymers: Classification of polymers; natural and synthetic polymers, important uses and formula of PVC, neoprene, Teflon, Buna-S, Nylon-6, Bakelite.

(3 periods)

MATHEMATICS

PAPER - I

Marks - 50

UNIT - I (35 periods) **Time - 2.30 Hrs.**

Set : Idea of union, intersection, difference, symmetric difference, complemention, De morgans laws and cartesian product.

Complex no : Idea of complex numbers, moduls, argument and conjugate of complex nos. Extraction of square roots cube roots of a complex number. Statement of D'moivre's theorm and application.

Relation : Definition, domain, range inverse of a relation, equivalence relation, congruence module relation.

Function : Definition, domain, range, injective, surjective and bijective function, Inverse of a function, odd a even functions. Brief idea of real valued function of a real variable such as |x|, [x] $\log_a x$, a^x, e^x, lnx.

UNIT - II (33 periods)

Trigonmetry : Trigonometric ralations of compound, multiple and submultiple angles and standard trigonometric formulae. Trigonometric equations and their general solutions. Properties of triangles, inverse trigonometric functions.

Co-ordinate geometry of two dimensions :

Rectangular co-ordinate system. Distance and Division formula. Area of triangle. Slope of a line and angle between lines. Equations of a stline in different forms. Distance of a point from the line. Family of stlines equation of the angle bisectors.

Circle : Definition and equation of a circle equation of a circle in paramitrir form Tangents and normals to circle system of circles.

MATHEMATICS
PAPER - II

Marks - 50

Time 2.30 Hor.

UNIT - I (35 periods)

Determinant and Matrices :

Determinants upto order three, minors and cofactors, properties of determinants, cramer's rule.

Matrices, algebra of matrices, transpose and inverse a matrix, solution of system of linear equations by matrix inverse method.

Vector: Vectors and scalars, types of vectors, algebra of vectors, position vectors of a point, Resolution of vectors into components.

Scalar (dot) and vector (cross) product of two vectors and its geometrical meaning, commutative and distributive properties of dot and cross product (without proof), Scalar triple product.

UNIT - II (33 periods)

Limit and continuity : Limit of a function (Definition only) left hand limit and right hand limit, infinite limit and limit at infinity, continuity.

Diffeerentiation : Derivatives, its geometrical and physical meaning, derivatives of algebraic, trignometric, inverse trignomentric, exponential and logarithmic functions, Derivatives of functions in parametric forms, Derivatives of implicit functions, logarithmic differentiations.

Integral Calculus : Standard integration formulae, integration by method of substitution, by parts and by partial fractions, definite integrals and their properties. (without - proof)

UNIT-III

Binary arithmetic (only addition and Subtraction)

BIOLOGY

There shall be two theoretical papers. Paper - I and Paper - II. Examination for each theory paper shall be of 2.30 hours duration. Paper I shall be taught in the 1st year and Paper - II in the Second year. There will be no practical papers for this syllabus.

Examination Pattern:

Question on each theory paper of 5o marks shall consist of three groups covering all units of the paper as given in the syllabus. Number and nature of questions in each theory paper and mark distribution would be as follows.

Group - A

Question number 1 would be multiple choice type covering all the units 01x6 = 06

Question number 2 would be objective / very short answer type.All the bits are compulsory covering the entire syllabus. 01x09 =09

Group - B

Question number 3 would be short answer type with each bit carrying 02 marks and covering all the units of the syllabus. 02 x 7 = 14

Group - C

Question number 4 to 9 would be essay type each carrying 07 marks. Candidates have to answer any three questions out of these. 07 x 3 = 21

B.F.C. Course
BIOLOGY
1ST YEAR PAPER - I

F. M - 50

Time - 2.30 hrs

UNIT - I **(20 periods)**

Diversities of living organism (Darwinism and Lamarckism)

Branches of biology, Origin of life, theories of evolution, Characterstics of living organisms, classification (5-kingdom system). Status and position of bacteria and Viruses, Binomial nomenclature, salient features of all divisions of plants and Animals (Non-chordates, chordates, cryptogams and phanerogams) Scientific names of Rohu, Bhakura, Mirkali, kau, frog, Toad, House lizard, Garden-lizard, Crocodile, Turtle, Cobra, Krait, Fowl, Peacock, Pigeon, Crow, Tiger, Elephant, Cat, Dog, Rabbit and Man and Some economically important plants.(cereales, pulses, oil yielding, fiber yielding and medicinal plants).

UNIT - II

Morphology Cytology and Histology : **(25 Periods)**

cell as basic unit of life, cell theory, pro-karyotic and Eukaryotic cell; structure and importance of cell organelles, general characters of root, stem, leaf and inflorescence; **Amoeba, Ascaris,** Earthwom, Cockroach and Frog. structure and functions of epithelial, connective (Blood and Lymph), Muscular and nervous tissue. Cell division. (Mitosis and Meiosis), Plant Tissue (Meristematic and permanent), Anatomy of root, stem and leaf.

UNIT - III

Physiology of living Organisms: **(23 Periods)**

cell as physiological unit, Diffusion, Osmosis and Imbibition, Absorption of water, Ascent of sap, transpiration; photosynthesis; C_3- & C_4- plants; cellular respiration.

Intracellular and extra cellular digestion, Digestive system in human beings with associated glands (structure and function); Vitamins. structure and functions of heart of man; Blood group, Blood co-agulation; structure and function of kindney, Brain and Spinal cord of human beings;

B.F.C. Course
BIOLOGY
2ND YEAR PAPER - II

F. M - 50

Time - 2.30 hrs

UNIT - I **(20 periods)**

Re-production, Growth and Development:

Double Fertilization; Parthenogenesis; Parthenocarpy, growth and phyto hormones; Endocrine glands, and its secretion in Human being, male and Female re-productive system of human beings.

UNIT - II

Genetics and Molecular Biology : **(25 periods)**

Mendels laws of inheritance; DNA structure & function Chromosomes; Sex determination; DNA Finger printing, Recombinant DNA technology; Transgenic plants and animals.

UNIT - III

Ecology and Biology in human welfare : **(23 periods)**

Ecosystem (structure and function). Plant succession (Hydrosere and Xerosere). Common Problems of adolescene (drugs. Alcohol and tobacco), risk of indiscriminate use of drugs and antibiotics. organ transplantation. immunity; vaccines and vaccination; - (Types, Causes, diagnoisis, prevention and treatment of Malaria. Filaria, Amoebiasis, AIDS, Cancer Diabetes, Powdery Mildew of Peas Bacterial blight of rice), basic concept of ECG, EEG, CT-SCAN, Ultrasound and Endoscopy.

SYLLABUS FOR DAIRYING
1st - YEAR
THEORY (Paper - I)

Full Marks - 50

(2 Class Per Week) **Time = 2.30 hrs.**

Total=68 Periods.

1. History of dairy development in India.
2. Role of milk in human nutrition.
3. Indiaan dairy, draft and dual breeds of cattle and buffalo and Exotic cattle breeds used in India.
4. Characterisation and performance of cross-bred cattle.
5. Methods of selection and systems of breeding.
6. Judging of dairy animals.
7. Reproduction in dairy animals
8. Natural breeding, Artificial Insemination, their merits and demerits.
9. Liquid seman and frozen semen.
10. Techniques of collection, preservation, handling and storage of semen.

PRACTICAL
Paper - I

Full Marks - 50

(01 Practiclal Class Per Week) **Time 4 hrs.**

01 X 34 Classes **Total= 34 clases**

1. Study of external body parts of the cattle.
2. Identification of Indian and exotic breeds of cattle and buffaloes.
3. Common terms used in dairy farming.
4. Judging of dairy animals by score card method.
5. Study of different equipments used in A.I.

6. Physical evaluation of semen quality.
7. Visit to dairy farms, semen collection centre and frozen semen banks.

1st - YEAR
THEORY
Paper - II

Full Marks - 50

Time 2.30 hrs.

Total=68 Periods.

1. Classification of feed fodders used in livestock feeding with their functions.
2. Digestion and assimilation of nutrients in ruminants.
3. Rations - maintenance, production and preganancy requirement and schedule of feeding for new born, heifers pregnant and loctating animal, breeding bulls and bullocks.
4. Agronomical paractices for different perennial and seasonal grasses and fodder crops and conservation of fodders-straw hay and silage.
5. Treatment of paddy straw for its enrichment with urea and molasses.
6. Sign of health and diseases in animals, first aid treatment of common ailments.
7. Diseases of animal due to Bacteria, Virus and Parasites.
8. Metabolic and deficiency diaseases, and food poisoning of animal.
9. Vaccination schedule against common diseases.
10. Society for prevertion of cruelty to animal (SPCA) Act. And Cattle Insurance.

PRACTICAL

Paper - II

Full Marks - 50

(1 Class Per Week) **Time = 4 hrs.**

Total= 34 clases

1. Identification of common feed and fodders and fodder seeds,.
2. Processing of feeds- grinding, mixing, pilleting, packaging, storage and computation of ration.
3. Visit to fodder farms to observe the agronomical practices and feed processing plants.
4. Administration and application of different drugs.
5. Dressing and bandaging of wounds.
6. Recognisation of animal in health and diseases.
7. Visit to Veterinary clinics.

SECOND YEAR

THEORY

Paper - I

Full Marks - 50

Time = 2.30 hrs.

Total=68 Periods

1. Principles of dairy cattle management.
2. Care and management of newly born calves, heifers, pregnant animal, milch and dry cows bulls and bullocks.
3. Weaning and colostrums feeding.
4. Management of cross bred and high yielding cows in hot and humid climatic conditions.
5. Routine management practices in a farms including record keeping.
6. Clean milk production.

7. Selection of site for a dairy farm.
8. System of animal housing, their merits and demerits and floor space requirement of different categories of animals.
9. Hygiene and sanitation in a dairy farm and dispossl of animal waste and dead animals.

PRACTICAL

Paper - I

Full Marks - 100

(2 Class Per Week) **Time = 4 hrs.**

Total= 68 classes

1. Maintenance of pedigree sheet in a dairy farm.
2. Drawing of sketches of floor plan for different categories of animal.
3. Estimation of body weight from body measurements of animal.
4. Handling and restraint of animal.
5. Caculation of profit amd losses in a dairy farm.
6. Identification of animal, castration and dehoming.

SECOND YEAR

THEORY

Paper - II

Full Marks - 50

Time = 2.30 hrs.

Total= 68 Periods

1. Implementation of dairy development programmes in Orissa. Milk producer's co-operative society, Milk union and Milk federation. (OMFED).
2. Women dairy co-operatives society.
3. Physical characteristics and chemical composition of fluid milk.
4. Processing of milk-Pasteurisation, homogenisation, standardisation and preservation of milk.
5. Market milk-raw processed, toned, double toned and skimmed milk.

6. Cleaning and sanitisation of dairy equipments and utensils.
7. BIS standards of milk and milk products.
8. Manufacture of dairy products - khoa, chhenna, flavoured milk, dahi, paneer, butter milk, lassi, ghee etc.
9. Packaging and storage of fluid milk and dairy products.

PRACTICAL

Paper - II

Full Marks - 100

Time = 4 hrs.

Total= 68 classes

1. Determination of titrable acidity of milk.
2. Estmation of specific gravity, fat% SNF% and TS% of milk.
3. Conducting of COB and MBR tests of milk.
4. Detection of adulterants of milk.
5. Preparation of Value added dairy products.
6. Visit to dairy processing and chilling plants.

POULTRY FARMING

1st – Year

Theory (Paper-I)

Full Marks-50

Time-2.30 hrs

Theory- 68 Periods

Unit-I

Poultry Industry in India and in Orissa. Importance of egg and meat in human diet.

Unit-II

External body parts of chicken. Anatomy and physiology-brief outlines of digestive system. Excretory system, Reproductive system. Internal part of egg. Formation of egg, Composition of Egg

Unit-III

Common breeds of chicken and other poultry birds. Breed characteristics and utility. Systems of mating- Flock mating, Stud mating, and Shift mating. Preliminary idea on artificial insemination. Estimation of egg production-Hen housed, Hen day and survivor egg production. Recording of body weight in broiler birds.

PRACTICAL
Paper-I

Full Marks-50

(1 Class Per Week) **Time-4 hrs**

Practical -34 classes

1. Body points of chicken and ducks.
2. Handling, catching, wing banding and leg banding, debeaking.
3. Identification of poultry breeds- White Leghorn, Rhode Island, Vanaraja, Giriraja, Grama Priya and some commercial broiler strains.
4. Identification of internal organs; different parts of digestive and reproductive system.
5. Identification of good layers, poor layers and non-layers.

1st – Year
Theory (Paper-II)

Full Marks-50

Time-2.30 hrs

Theory-68 Periods

Unit-I

Poultry housing and Equipments: Selection of site. Types of poultry houses-Semi intensive, Intensive and backyard, low cost poultry house, Cage, Slat and Deep litter

system of housing, its advantage and disadvantages. Litter materials, Built-up litter as manure care and management of litter. Types of poultry equipments like feeder, waterer/ drinker and brooder etc.

Unit-II

Production, Selection and care of hatching eggs. Candling of eggs. Incubation principles and practise. Hatchery sanitation and management. Different fumigation process in hatchery.

Unit-III

Brooding, rearing of chicks growers and breeders. Light management of broilers and layer. Management and care under adverse conditions. Culling of different age groups of stocks. General management practices of ducks. Different moulting practise used for egg production.

Practical
Paper-II

Full Marks-50
Time-4 hrs
Practical - 34 classes

1. Candling of eggs.
2. Washing and fumigation of incubators and hatchers.
3. Identification of different types of poultry houses and equipments.
4. Culling.
5. Visit to poultry farms.
6. Identification of litter materials and quality assessment.

Second Year
Theory (Paper-I)

Full Marks-50
Time-2.30 hrs
Theory- 68 Periods

Unit-I

Poultry feeds and feeding practices- Classification of poultry feeds and feed stuffs based on energy and protein. Quality control and storage of poultry feeds. BIS standards of poultry feeds. Feed conversion ratio (FCR).

Feeding schedule for different types of poultry-Starter and Finisher for broilers, Chicks, grower, and layer for layer birds and breeder birds for both meat and egg type birds. Preliminary knowledge of feeds, formulation and preparation. Utilization of local available ingredients used in poultry feed. Different types of feeding practices like full feeding, Restricted feeding.

Unit-II

Signs of good health and ill health in poultry flock. Hygiene and sanitation. Classification of poultry diseases. Common disease of poultry; Ranikhet Disease, Fowl pox, Marke's Disease, Avian Influenza (Bird Flu), Avian leucosis complex, Chronic Respiratory Disease (CRD), Salmonellosis, E. Coli, Fowl Cholera, Aspergilosis & Eemerging disease, their prevention and control.

Unit-III

Round worm, Tape worm, lice, Tick and mite infestations, Cannibalism, Bumble foot, Crop Impaction, Egg bound condition. Different vices of Poultry, Vaccination schedule for layer and broiler birds.

PRACTICAL

Paper-I

Full Marks-100

Time-4 hrs

Practical - 68 classes

1. Identification of common feed ingredients. Storage and stocking of feed.
2. Visit to feed mixing centre. Mixing of feed.
3. Collecting feed samples for analysis.
4. Identification of healthy and unhealthy birds.
5. Vaccination.
6. Calculating the feed requirement of broiler poultry farm

SECOND YEAR

THEORY

Paper-II

Full Marks-50

Time-2.30 hrs

Theory- 68 periods

Unit-I

Processing, preservation & marketing of egg and meat. Interior parts of egg. Composition of egg. Egg quality. Cleaning & grading of egg. Packing, transport & preservation of egg. Egg and meat marketing channels. Sexing of day old chicks.

Unit-II

Transportation of birds before slaughtering. Slaughtering, scalding, feather plucking, evisceration, chilling, packing. Value added egg and meat products

Unit-III

Maintenance of farm records. Preparation of model schemes. Economics of poultry farming. Institutional credit and insurance.

PRACTICAL
Paper-II

Full Marks-100

Time-4 hrs

Practical - 68 classes

1. Egg grading
2. Dressing of poultry bird and packing
3. Dubbing and Dewinging
4. Distinguishing between male and female chickens & ducks.
5. Visit to duck farm and identification of duck breeds.
6. Sexing of chicks.

FIRST YEAR
Paper - I (Theory)
BASIC HORTICULTURE AND FRUIT CULTIVATION

Full Marks - 50

(Weekly one period Total=68 periods per year)

Introduction, defination of horticulture, divisions of horticulture (pomology, olericulture, floriculture, spices, plantation crops, aromatic and medicinal plants fruit nurseries, fruit and vegetable processing and marketing in brief)

Soil: Types of soil, soil fertility, soil organic matter content, nature of soil suitable for production of horticultural crops.

Climate : Climatic factors influencing production of horticultural crops.

Importance, present status and furture prospects of fruit cultivation in India with special emphasis on Orissa. Cultivation aspects of major fruit crops with special reference to climate, soil, varieties, propagation, manuring, irrigation, interculture, insect pests, diseases, disorders, intecropping, harvesting, yield, post harvest care, storage of mango, banana, citrus (sweet orange, mandarin, lime and lemon), guava, sapota, litchi, papaya, pineapple, pomegranate, custard apple, anola, ber, jackfruit.

FIRST YEAR

Paper - II (Theory)

PLANTATION CROPS AND SPICES, MEDICINAL & AROMATIC CROPS.

Full Marks - 50

(Weekly one period Total=68 periods per year)

Plantation crops :

Importance, scope and future prospect of plantation crops in India and Orissa. Details of cultivation aspects with special reference to origin, climate, soil, varieties, propagation, planting, aftercare, manuring, irrigation, moisture conservation, weeding, interculture, insect pests, diseases, intercropping, harvesting, yield, post harvest care, storage, processing, value addition, byproduct utilization of important plantation crops like coconut, cashewnut and arecanut.

Spices, medicinal and aromatic crops :

Importance of speices, medicinal and aromatic crops grown in India as well as in Orissa. Classification of spices, medicinal and aromatic plants.

Details of cultivation aspects of ginger, turmeric, blackpepper, coriender, cinnamon, cardamom, (special reference to climate, soil, varieties, land preparation, sowing, planting, manuring, irrigation, weeding, interculture, plant protection measures, moisture conservation, harvesting, yield. processing and storage). Details of cultivation aspects (as mentioned for spices crops) of aloe, brahmi, aswagandha and betelvine.

Cultivation practices, harvesting and oil extractiion of lemon grass and pamarosa.

SECOND YEAR

Paper - I (Theory)

VEGETABLE PRODUCTION & FLORICULTURE

Full Marks - 50

(Weekly one period Total=68 periods per year)

Vegetable crops :

Introduction. Role of vegetables in human nutrition. Importance of vegetable cultivation. Present status and future prospects of vegetable cultivation in India as well as in Orissa. Classification of vegetable garden. Off season vegetable cultivation.

Details of vegetable cultivation with special reference of food value, varieties, climate, soil, nursery raising, sowing / planting, manuring, interculture, irrigation, drainage, insect pests, diseases, physiological disorders, harvesting and yield of brinjal, tomato, chilli, okra, radish, onion, garalic, potato, yam, sweet potato, elephant foot yam, cowpea, beans, pea, cabbage, cauliflower, knolkhol, pumpkin, cucumber, bitter gourd, watermelon, ridgegourd, pointed gourd, spine gourd, greens (amaranths, palak, basella)

Floriculture :

Introduction, importance of floriculture. Present status and future prospects of floriculture in india as well as in Orissa. Defination of garden, types of garden. garden features and adornments. lawn, rock garden, layout of garden for home & public place. Flowering trees, shrubs, creepers, annuals, culture of pot plants.

Cultivation practices of commercial floriculture crops such as rose, chrysanthemum, dahlia, marigold, tuberose, gladiolus and jasmine with special reference to varieties, climate, soil, sowing, planting, manuring, interculture, irrigation, drainage, insect pests, diseases, harvesting, yield, packaging & storage.

SECOND YEAR

Paper - II (Theory)

POST HARVEST MANAGEMENT AND PRESERVATION OF FRUITS, VAGETABLES AND ORNAMENTAL CROPS.

Full Marks - 50

(Weekly one period Total=68 periods per year)

1. Importance of preservation and extent of post harvest losses.
2. Maturity standards for fruits and vegetables, handling, grading, packaging and transportation.
3. Techniques of storage including cold storage.
4. Use of growth regulators and emulsion for extending the storage life.
5. Importance of preservation industry in India as well as in Orissa.
6. Principles and methods of preservation by low temperature, chemical additives, salt, sugar, heat, drying etc.

7. Preparation and preservation of fruit juice, syrups, squashes, cordials, jam, jelly, marmalade, chutney, ketchup, pickles and sauces.
8. Drying and dehydration of important fruits, vegetables and flowers.

FIRST YEAR

Paper - I (practical)

BASIC AND FRUIT CULTIVATION

Full Marks - 50

(1 class per week,Total 34 clases. Each class consisting of 3 period)

Total - 34 classes

Fruit Crop(s) Production :

1. Identification of fruit trees and their varietes.
2. Study of fruit setting and fruit drop in fruit plants (mango, guava, citrus)
3. Selection of site, planning, soil and soil management, layout of orchard.
4. Method of planting of fruitplants, (papays, mango, banana, citrus, guava, litchi, sapota)
5. Lay out of different irrigation systems for fruit plants.
6. Study of different intercultural operations in fruit plants.
7. Study of method of manuring & fertilizer application in fruit plants with calculation of fertilizer requirement.
8. Method of spraying for controlling plant diseases in some fruit plants (mango, banana, guava, sapota, litchi & citrus)
9. Method of application of growth regulators in different fruit plants (mango, pineapple, citrus, guava) and calculation for different concentrations with preparation of the stock solution.
10. Training & pruning in fruit plants.

FIRST YEAR

Paper - II (practical)

(1 class per week,Total 34 clases. Each class consisting of 3 period)

Full Marks - 50

Total - 34 classes

Propagation :

1. Study of different propagation structures equipments, farm implements and horticultural tools.
2. Media and soil mixture for raising seedlings & cuttings.
3. Testing the seed germination, viability and vitality of seeds.
4. Seed tretment methods, preparation of seedbeds, Sowing of seeds in shallow pots,
5. Study of vegetative propagation of plants by modified plant structures (bulbs, corms, rhizomes, tubers, suckers, runners)
6. Propagation of plants by cuttings with and without use of growth regulators.
7. Method of plant propagation by gooty (air layring)
8. Different methods of budding & grafting.
9. Potting of seeddings in the pots, polyethylene bags and other containers and planting in nursery beds.
10. Raising of root stock for grafting & budding of fruit plants.
11. Selection of scion and pre-conditioning and collection of scion for grafting.
12. Estimation of cost of production of grafts.
13. Planning for developing nursery.
14. Planting & management of mother plants.
15. Site selection for nursing.
16. Raising of nursery plants.
17. Potting and repotting of plants.
18. Management of grafts in nursery & aftercare.
19. Water management in nursery.
20. Protection of plants from heat ley using shadents.

21. Plant protection measure in nursery.
22. Hardening of nursery plants.

Plantation, spices, medicinal & aromatic crops :

* Identification of plantation crops.
* Identification of spices crops.
* Identification of medicinal & aromatic plants.
* Visiting orchands & studying different problems of plantation crops in the orchards.

SECOND YEAR

Paper - I (Practical)

Full Marks - 100

(Weekly Two class Total=68 clases per year. Each class consisting of 3 period))

Vegetable Crops :

1. Identification of vegetable seeds & seed testing.
2. Preparation and management of nursery beds (Soil solarisation)
3. Treatment of seeds and seedlings.
4. Raising of seedlings both in kharif & rabi season.
5. Raising of seedlings in polyhouse for off-season and early vegetable cultivation.
6. Controlling diseases & pests in nursery.
7. Identification of vegetable crops in the field.
8. Land preparation for planting or transplanting of vegetable seedlings.
9. Planting of vegetable seeds / seedlings.
10. Raising of vegetables in small plots (rabi, kharif & summer) two crops/per student.
11. Method of application of manures & fertilizers (basal &topdressing)
12. Study of types of manures & fertilizers.
13. Calculation of fertilizers for vegetable crops.
14. Use of growth regulators in vegetable crops (cucurbitaceous crops)
15. Identifying important diseases & pests of vegetable crops and their control measures.
16. Study of deficiency symptoms disorders in vegetable crops.

17. Calculation of cost of cultivation of important vegetable crops. Floriculture crops.
18. Identification of ornamental plants (trees, shrubs, creepers and annuals)
19. Identification of orchids, fern, cacti, succulents.
20. Preparation of nursery beds for annuals.
21. Raising of seedlings in beds.
22. Preparation of flower beds and transplanting the seedlings
22. Preparation of flower beds and transplanting the seedlings (annuals)
23 Preparation & maintenance of lawn.
24. Preparation of planting materials for rose, chrysanthemum, dahlia.
25. Collection & storage of corms of gladiolus & pulles of tuberose.
26. Potting & repotting of ornamental plants.
27. Selection of plants for avenue plantation.
28. Identification of indoor plants.
29. Flower arrangement, preparation of garlands, bouquets.
30. Visit different ornamental gardens.

SECOND YEAR

Paper - II (Practical)

Full Marks - 100

(Weekly Two class Total=68 clases per year. Each class consisting of 3 period)

Post harvest technology & processing :

1. Study of maturity standards for different fruits and vegetables.
2. Methods of harvesting (lay using harvester), ripening, sorting, grading & packaging.
3. Study of storage life of fruits, vegetables & flowers.
4. Preservation of fruits & vegetables by low temperature, chemicals, salt, sugar, and drying.
5. Storage of preserved products (fruit juices, syrups, squash, jam, jelly, chutney, pickles, sauces.
6. Drying & dehydration of important fruits & vegetables. Preparation of potato chips.

7 Visiting processing industries.

8. Study of zero energy sotage, low cost storage structure of onion, patato, ginger, turmeric etc.

9. Study of stage, time, method of harvest of different fruits, vegetables and ornamental crops for enhancing the self life.

10. Post harvest management of horticultural crops.

SYLLABUS ON SERICULTURE

Objectives of Vocational Course :

1. To educate the students on scientific principles underlying the vocation of sericulture and associated activities.
2. To impart intensive practical training to students for imbibing self confidence and inspire them for self employment in sericulture.
3. To create employment opportuinities for unemployed rural youth in sericulture and allied sector.
4. To empower students to act as facilitators for promotion of sericulture and poverty alleviation in rural areas.
5. To enable the students to take up higher studies / specialized training, research and extension activities related to sericulture.
6. Capacity building towards establishment of cottage industry, quality silk production and enhancement of national income.

FIRST YEAR

INTRODUCTORY SERICULTURE

Paper - I (Theory)

Full Marks - 50

Total- 68 periods

1. Soil and soil types amendment of problematic soil; soil erosion and conservation
2. Role of plant nutrients (major and minor) their absorption and translocation
3. Cell biology cell organelles, their function in cell, cell division, haploid, diploid, polyploidy, heterosis

4. Kinds of seed, methods of seed dispersal, germination, factors responsible for germination
5. Function of leaf, photosynthesis, respiration and transpiration
6. Types of crops : cereals, millets, pulses, oil seeds, fiber crops, sugar crops, vegetables, ornamental crops, fruit crops, plantation crops, green manuring crops, forage crops, grasses, medicinal plants, narcotics, hedge plants
7. Sericulture: its history, importance, origin, types of silk worms and their races, voltinism, moultinism, systematic position of various silk worms and their geographical distribution,; salient feature of the silk worms
8. Host plants of different types of silk worms and their geographical distribution
9. Disease csusing organisms like fungi, bacteris, virus protozoa, nematodes etc., insect pests of silk worms
10. Pesticides: bio-pesticides, their formulation, various pest control appliances

FIRST YEAR

INTRODUCTORY SERICULTURE

Paper - I (Practicals)

(Weekly one class,Total 34 clases. Each class consisting of 3 period)

Full Marks - 50

Total - 34 classes

1. Fundamental units of measurement and use of conversion table
2. Study of microscope and its use
3. Determination of soil P^H
4. Study of different meteorological factors and their measurement
5. Acquaintance with different types of crops
6. Acquaintance with different food plants of silk worms (Mulberry, Tasar, Muga, Eri)
7. Study of different morphological traits of silk worm and their life stages
8. Study of various systems of silk worm
9. Acquaintance with different manures, fertilizers and calculation of their requirement in field (3)
10. Acquaintance with various pesticides, their formulations, Bio-pesticides, bio-agents (3)

11. Preparation of spray solutions and dust dilution
12. Acquaintance with different plant protection equipments and their safe handling

FIRST YEAR

MORICULTURE

Paper - II (Theory)

Full Marks - 50

Total - 68 periods

1. Botanical nomenclature, origin and distribution of mulberry and non-mulberry host plants of different silk worms (2)
2. Varieties of mulberry, their characters, yield and varietal imporvement (2)
3. Package of practices for moriculture (both irrigated and rain fed) (10)

   Soil type : type of soil, their suitability

   Nursery preparation : Selection of planting material, planting method, spacing, interculture, pruning, plant care.

   Land preparation : Digging, ploughing, discing, harrowing, levelling, lay out, pit making, ridge and furrow making.

   Nutrition : Sources of nutrients like manures, fertilizers, types of manures and their composition, doses, method of application.

   Interculture and water management : Weeding, training,

   Interculture and water management : Weeding, training, pruning, irrigation, methods and frequency of irrigation, methods of conservation of water in soil.
4. leaf selection and harvesting for silk worm rearing; leaf harvesting methods, transportation, preservation of leaves, seasonal influence on leaf yield (3)
5. Mulberry diseases : Root rot, stem rot, rust, leaf spot, powdery mildew, symptoms of various diseases, types of damage, extent of loss, seasonal occurrence, Disease management practices (4)
6. Insect pests of mulberry : Sucking insects like jassids, scales, white-flies, mealy bugs leaf eating insects like grasshoppers, hairy caterpillars, cut worms; internal borers like stem borer; nematodes; their seasonal occurrence, damage symptoms, extent of loss, prophylactic and curative methods, of control (6)

FIRST YEAR
MORICULTURE
Paper - II (Practical)

Full Marks - 50

Total - 34 classes, 1class- 3 periods

1. Morphology of mulberry root, stem, leaf and flowers
2. Propagation of mulberry through different methods :
   (a) Sexual, seed collection, seed bed preparation, sowing
   (b) Selection of materials, preparation of cutting, planting methods
   (c) Layering : different methods.
   (d) Grafting: selection of stock and scion material, different types of grafting
   (e) Budding : Different methods
   (f) Preparation of cuttings and treatment with root inducing chemicals
   (g) Methods of soil sampling
3. Acquaintance with farm tools and implements, their use
4. Land preparation; lay out preparation, digging, ploughing, levelling, bunding, harrowing, hoeing, equipment operations
5. Practiceof different planting methods (both irrigated and rain fed)
6. Identification of different manures and fertilizers; calculation of doses
7. Training and pruning methods appliances used for pruning
8. Leaf harvesting; identification of type of leaf, leaf quality determination, transport and preservation
9. Farm Management Labour rules, maintenance of overseer's diary, muster roll preparation, wage calculation
10. Identification of disease symptoms in mulberry and insect pests of mulberry; identification of nematodes; recording disease symptoms, Preparation of calender of control measures
11. Identification of non-mulberry hosts and their package of practices

SECOND YEAR

REARING AND GRAINAGE TECHNOLOGY IN SERICULTURE

Paper - I (Theory)

Full Marks - 50

Total - 68 periods

1. Study on metamorphosis : morphology of egg, larva, pupa and moth of mulberry silk worms. (5)
2. Environmental requirement for rearing :temperature, humidity, air, light, optimum requirement for different stages, methods of maintenance. (2)
3. Rearing house :location, types of rearing house-comparison with model rearing house-requirements-orientation-utilization of locally available materials-modifications. (5)
4. Rearing appliances and their uses. (2)
5. Preparation for distinfection:cleaning-washing-drying-disinfection, hygienic rearing. (2)
6. Incubation: light-humidity-air-temperature requirement-significance of black boxing-postponement of brushing (2).
7. Hatching : methods of brushing-chawki rearing, methods of rearing dvantages and disadvantages-effect of seasons-environmental requirements- feeding schedule- selection of leaf-spacing- cleaning- care during moulting- use of bed disinfectants concept of CRC-organization of CRC - community chawki rearing - advantages, disadvantages- care during transportation (2).
8. Rearing of late age silk worm : rearing methods, advantage, disadvantage. Effect of seasons- Environmental requirements. - spacing- cleaning, feeding schedule - care during moulting leaf requirement - quality and leaf preservation (1)
9. Types of mountages- moulting of ripened worms - method of mounting - Density- care during mounting. Environmental requirement-harvesting, cleaning- preserving and assessing cocoon quality -record maintenance - transportation - care during transportation. Differences between seed rearing and commercial rearing (3).
10. Diseases of silk worm- pebrine, bacterial, viral, fungal - causal organisms, mode of infection, symptoms, prevention and control (2)
11. Insect pests of silk worm - Indian Uzi fly and dermestid beetle their life cycle, type and extent of damage, control measures (2).

12. Seeds Introduction, DFLS - types of seeds - commercial seed- reproductive seed-non-hibernating and hibernating eggs (2)
13. Model grainage: basic requirements-plan of grainage. Equipments, Assessment of quality of seed cocoons and their transportation (1).
14. Programming of seeds production : preparation of grainage -preliminary examination of seed cocoons- pupal gut examination and forced eclosion test for pebrine diease sorting of seed cocoons, sexing-preservation of seed cocoons / pupae- temperature, humidity : light - air requirements (3)
15. Moth emergence, time of emergence, coupling- decoupling, oviposition, moth examination. cellular method and loode eggs importance of temperature, humidity and light - refrigeration of male moth (1)
16. Seed organization, seed multiplication and organization of seed area- Seed Legislation Act (1).

SECOND YEAR
REARING AND GRAINAGE TECHNOLOGY IN SERICULTURE
Paper - I (Practical)

Full Marks - 100

Total - 68 Classes

1. Study of morphology of Bombyx mori, Anthaeraea mylitta, Anthaeraea assama and philosamia ricini, by specimen identification and making labelled sketches of their egg. larva, pupa and moth
2. Dissection of digestive system and silk glands of moth-study of mouth part of moth
3. Study of model rearing house-plan
4. Acquaintance with sketching of rearing appliances and their use
5. Disinfectants: identification, preparation - disinfection of rearing house and appliances - fumigation
6. Surface sterilization of eggs - Black boxing- exposure to light synchronization- hatching - hatching performance calculation
7. Harvesting of cocoons after late worm rearing- Defective
8. Harvesting of cocoons after late worm rearing- Defective cocoons, sorting - assessment and yield calculation
9. Observation on external symptoms of diseased larvae (Pebrine, Grasserie, Flatcherie and Muscardine)- identification of diseased life stages- gut and haemolymph test- preparation of smear-identification of pathogens of various diseases

10. Moth testing : individual and mass testing - drying of moths-grinding-smear preparation - arrangement of smears- microscopic examination, mangnification required - use of centrifuge
10. Moth examination : method of individual, mass, green, moth examination. Disinfection and washing of eggs; identification of perbrine spores
11. Preparation of layings and loose eggs- merits and demerits- parent seed and hybrids-multivoltine and bivoltine eggs
12. Artificial hatching of silkworm eggs- common acid treatment- Acid treatment after chilling- precautions - Age of eggs and timing of acid treatment
13. Hibernation of silkworm eggs - hibernation schedules- importance of temperature and humidity - Embryo test - refrigeration of acid treated and multivoltine eggs - transportation of eggs
14. Incubation of eggs - importance of temperature, humidity, light and air
15. Moth emergence - identification of male and female moth, defective moths
16. Synchronization of emergence- refrigeration of cocoons and moths - coupling, decoupling, oviposition
17. Preparation of laying on cards- identification of hibernating and non- hibernating eggs- loose egg preparation
18. Economics of seed production and cost of production- maintenance of records- storage of pierced cocoons
19. Seed organization - seed multiplication and organization of seed area- seed legislation Act .

SECOND YEAR
INDUSTRIAL SERICULTURE, EXTENSION AND MANAGEMENT
Paper - II (Theory)

Full Marks - 50

Total - 68 periods

1. Cocoons - properties of cocoons and their impact on reeling performance-cocoons assessment-defective cocoons (1)
2. Stifling / Drying : objective - various methods of stifling, steam stifling, sun drying - Hot air drying- merits and demerits of each method (1)
3. Storage and preservation of cocoons : Ideal conditions for cocoon storage- effect of defective storage- cocoons reelability, use of certain chemicals etc. - storage of hot air dried / steam stifled cocoons (1)

4. Cooking of cocoons: objective : various methods of cooking - open pan - 3 pan - pressurized cocoon cooking - characteristics of water for cocoon cooking - cooking methods for tasar and eri cocoons (1)
5. Reeling : various systems of reeling - floating and sunken system of reeling - reeling process for tasar cocoons - various types of reling equipments - charkha - cottage basin- tasar reeling charkha- multiend basin - semi automatic reeling - automatic reeling- reeling calculation - production - denier - renditta, reeling of double cocoons - dupion silk - re-reeling- objective - standard hanks. (3)
6. Collection and preservation of silk waste cooker waste - reeling waste- basin residue - burst open cocoon waste - cleaning of waste- drying- storage of waste (1)
7. Silk examination and packing : Tracing of defects in skein- removal of defects - removal of gum spots- hank making - book making. balling (1)
8. Filature management : organization - planning- costing (2)
9. Raw silk testing : objective- various methods of testing - visual and mechanical testing- winding - size test- evenness, neatness and cleantiness test- Tenacity and elongation- cohesion- conditioned weight- grading of raw silk - ISI standards.(1)
10. Spinning : raw materials - various forms of silk waste- cocoon waste- degumming- drying- spinning on pedal charkha- drafting- twisting - winding- various processes in spun silk mill-eri and tssar waste spinning processes (2)
11. Definition of want, demand, supply, price value, utility, marks demand, elasticity of demand factors responsible for silk production- entrepreneurship (1)
12. Role of sericulture in national economy - sericulture legislation - principles of accountancy, single and double entry system- maintenance of registers and records, preparation of balance sheets (2)
13. Financial agencies involved in sericulture industry- terms and conditions of loan, crop insurance, developmental schemes and subsidies (1)
14. Organization of cooperative sector in sericulture- aims and objectives, cooperative principles, organization of cooperative in rearing, reeling and other areas. Incentives and regulation. Management for effective participation in sericulture (1)
15. Marketing- Principles of marketing, costs, defects - regulated markets, merits and demerits- cooperative marketing, stabilization of prices, marketing of cocoon and silk yarn (2)
16. Extension- objectives, methods of extension- training and visit- individual, mass contsct, demonstrations, use of audiovisual aids, conduct of field days (2)

SECOND YEAR

INDUSTRIAL SERICULTURE, EXTENSION AND MANAGEMENT

Paper - II (Practical)

Full Marks - 100

Total - 68 classes

1. Cocoon assessment- cocoon weight- shell weight, shell percentage- types of defective cocoons- rendita- assessment of cocoon quality in tasar and eri
2. Cocoon stifling- steam stling- Hot air drying
3. Single cocoon reeling for filament length - non- breakable filament- denier - reelability
4. Cocoon cooking- open pan- three pan cooking- pressurized cooking
5. Reeling techniques- Charkha reeling- cottage / multiend basin- praparation of cooked cocoons - preparation of resultant thread- passage of thread in reeling device- button- jette about- Croissure, guide pulleys- traverse bar- reed- maintenance of required number of cocoons for end- maintenance of reeling ends in charkha- cottage multiend basin- tasar reeting process and its machineries
6. Re-reeling- Skein making lacing- hank making- book making.
7. Silk spinning- degumming of waste cocoons- hand spinning on pedal spinning wheel
8. Yarn testing- Denier count and gradation of cocoons and silk
9. Visit to filatures and reeling establishments in the tasar sutor
10. Survey and collection of data, compilation, tabulation, presentation
11. Maintenance of machinery and records: Cleaning / oiling of machineries- repair - replacement of old machines- maintenance of various registers
12. Defination and scope of sericulture- statistics- collection of data sampling - survey- use of questionnaires, proforma for collection of data- compilation- tabulation, preliminary anaysis- report writing
13. Visit to different organizations offering technical services, supplying planting materials, laying seed cocoons and other inputs of sericulture
14. Utilization of by-products for dairy, fisheries, gobergas, oil extraction, poultry feed, fuel
15. Practical training on project preparation-model bankable schemes for various sericulture programmes, conducting survey on the role of Govt / C.S.B. and Voluntary organization for development of sericulture, afforestation for development of food plant area in respect of wild silk worm like tasar

16. Analysis of data, praparation of reports
17. Visit to sericulture cooperatives, chawki rearing cooperatives, reeling cooperatives, silk marketing cooperatives
18. Visit to cocoon markets, silk exchange, silk marketing organizations, silk merchants
19. Visit to seed area, private seed producers, silk farms, Government grainages
20. Visit to technical service centers, farmers, praticipation in exhibitions, field days
21. Visit to financial agencies, filling up application forms and visit to other sericultural institutions

FIRST YEAR
SYLLABUS ON INLAND FISHERIES
Paper - I (Theory)

Full Marks - 50

Total - 68 periods

(Introduction to Inland Fisheries)

(Fisheries resources, Capture fisheries, Craft & Gear, Fisheries management)

1. Introduction to fisheries: Importance of fish; Present status (Globa, India and Orissa context); Type of fisheries (Freshwater / pond, brackish water / estuarine, marine, reservoir, lake, riverine, etc.);
2. Fisheries resources available: Marine resources, Inland- resource (Brackish water resources: Lake, lagoon, estuary, tidal mudflat, backwaters; and freshwater resources: Riverine resources, reservoirs, bheels, ponds and tanks, canals, etc).
3. Species contributing to inland fisheries: A general account of economically important freshwater and brackish water fin and shellfishes: their distinguishing characters for identification, food and feeding habits, growth and reproduction migration.
4. Reservoir / lake fisheries: Conservation of fish stock : stocking with fish: culture and capture management.
5. Coldwater fisheries : Species; resource management.
6. Fish catching devices : Common inland fishing craft and gears; their usefulness, operation; restriction of use; CPUE; fish aggregating devices; etc.

FIRST YEAR
SYLLABUS ON INLAND FISHERIES
Paper - II (Theory)

Full Marks - 50

Total - 68 periods

(Introduction to Aquaculture)

(Principles of aquaculture, Culture management of different species)

1. History of aquaculture.
2. Principle of aquaculture : Importance of aquaculture; culture practices (Conventional: monoculture, composite fish culture, mized culture); (Non conventional: sewage feed fisheries, waste water aquaculture, integrated farming). method of culture: (traditional / semi - intensive / intensive); species chosen for culture (fish / prawn / catfish / air breathing / mollusk).
3. Type of fish farm : Freshwater / brackish water, types of ponds (nursery, rearing, grow-out, booder); layout; design and construction of fish farm; cage; pen.
4. Fish culture: Pond preparation removal of unwanted aquatic weeds, weed fishes, predatory fishes; pond fertilization; stocking, feeding to fishes; fish health management; pond environment management; harvesting.
5. Brackish water aquaculture : Imoprtant fishes and shellfishes for culture; collection of seed and stocking; culture practice.
6. Freshwater prawn culture: Important species for culture; seed stocking; culture practice.
7. Ornamental fish culture: Preparation of indoor system for culture; species and their rearing management.
8. Catfish and air breathing fish culture: Important species for culture; seed stocking; culture practice.
9. Integrated aquaculture : Prinicipal; fish-cum-poultry / duck / pig / goat / cattle culture.

FIRST YEAR
INTRODUCTION TO INLAND FISHERIES
Paper - I (Practical)

Full Marks - 50

Total - 34 classes

1. Morphometry of typical fin and shellfishes.
2. Identification of common freshwater / brackish water / marine fishes and prawns.
3. Gut content analysis of cultivable fishes.
4. Common craft and gears used in fisheries activities.
5. Fabvication, repair and operation of common fishing craft and gears.
6. Measurement of fish length amd growth; establishment of relationship.
7. Visit to a fishlanding centre and record of fish catch.
8. Record preparation.

FIRST YEAR
INTRODUCTION TO AQUACULTURE
Paper - II (Practical)

Full Marks - 50

Total - 34 classes

1. Identification of common cultivable fishes and prawns.
2. Identification of fish fry & fingerlings.
3. Identification of post-larvae of freshwater prawn.
4. Identification of nauplius; mysis; zoea and juveniles of brackish water prawn.
5. Identification of common weeds; aquatic insects; weed fishes and predatory fishes of culture pond.
6. Visit to fish farm: study culture practice; improvement of village tank for fish culture.
7. Soil and water analysis: Dissolved oxygen; pH; cabon dioxide; nutrients, alkalinity; salinity; etc.
8. Home aquarium preparation : Construction; setting; maintenance
9. Identification of fish food organisms.
10. Identification of locally avaolable fish feed ingredients and formulation of fish feed.
11. Identification of common fish diseases.
12. Record writing.

SECOND YEAR
INTRODUCTION TO INLAND FISHERIES
Paper - I (Theory)

Full Marks - 50

Total - 68 periods

(Fisheries Management)

(Culture / Capture Fisheries Management, Post-harvest Management, Extension, Financial Institutions)

1. Economicsof fish culture operations (fish culture prawn culture, integrated aquaculture).
2. Fishery dynamics : Recruitment natality, mortality; over fishing etc.
3. Conservation of fish diversity; Declaration of sanctuaries; ban of fishing in breeding season; ranching.
4. Pollution and its management in aquatic bodies.
5. Post-harvest techniques: Fish packing for transport; preservation (in ice.salt); fish products (dry fish, pickle, smoked fish, canned fish, etc.)
6. Fisheries extension: Principles and objectives methods.
7. Fisheries Cooperative Societies: Cooperative principles; organization of FCSs; cooperative marketing.
8. Fishmarketing: Its function; services; transport; channel; wholesalers, retailers;organizaed marketing; pricing.
9. Financial and Development Agencies involved in fisheries development and their role

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SECOND YEAR
INTRODUCTION TO INLAND FISHERIES
Paper - II (Theory)

Full Marks - 50

Total - 68 periods

(Seed production of fish and shellfish)

(Natural and Artificial Fish and Shellfish Breeding, Hatchery Management, Nursery Rearing of Seed)

1. Present status : Present status of fish and shell fish seed production in the country.
2. Seed production in carps: Natural spawning of carps in rivers and reservoirs (spawning season, ground, factors influencing spawning, techniques of riverine spawn collection); hypophysation; spawning of carps in bundhs (wet and dry bundh); pituitary gland of fish (its hormones, collection, preservation and use); brood stock development for breeding (male and female identification, maturity, fecundity), hapa breeding (types of hapa brood selection, inducing agents, injection of inducing agents to brood, egg / milt release, fertilization, incubation and spawn production); hatchery production of spawn; hatchery management; cryopreservation of gametes.
3. Breeding and seed production of common carp.
4. Breeding and seed production of air breathing and catfishes.
5. Breeding and seed production of freshwater prawns; development stages; feeding.
6. Breeding and seed production of brackish water fishes.
7. Breeding and seed production of brackish water prawns and crabs; eyestalk ablation; developmental stages; feeding.
8. Fish seed collection, measurement, conditioning; transport of fish seed and brood fish.
9. Nursery pond preparation; seed stocking; rearing management.

SECOND YEAR
FISHERIES MANAGEMENT
Paper - I (Practical)

Full Marks - 100

Total - 68 classes

1. Visit to wholesale and retail fish market for studying the pricing structure.
2. Visit to fisheries cooperative society to study its role.
3. Visit to an integrated fish culture site and calculate it seconomics.
4. Visit to fish processing plant.
5. Visit to boat building yard.
6. Dry fish preparation.
7. Fish packing in ice.
8. Fish preservation in salt.
9. Preparation of records.

SECOND YEAR
SEED PRODUCTION OF FISH AND SHELLFISH
Paper - II (Practical)

Full Marks - 100

Total - 68 classes

1. Collection, preservation of fish pituitary gland.
2. Preparation of PG extract.
3. Identification of male and female breeder fish.
4. Identification of gravid prawn.
5. Visit to a fish hatchery amd write its components and functions.
6. Identification of carp egg and spawn.
7. Spawn counting, packing and transport.
8. Maturity stages of carp.
9. Breeding of common carp.
10. Hapa breeding / hatchery breeding.
11. Magur breeding.
12. Visit to a nursery pond and describe its preparation.

Reference Books :

1. Handbook of fisheries and aquaculture. ICAR, New Delhi.
2. Fifty years of fisheries research in India. Eds: K. Gopakumar, B. N. Singh, V. R. Chitransi, ICAR, New Delhi.
3. Text book of breeding and hatcherymanagement of carps. By: S. D. Gupta, B. C. Mohapatra, P. Routray, S. K. Sahoo, D. K. Verma, N. Narendra Publ. House, Delhi.
4. Bottom soil sediments and pond aquaculture. By: C. E. Boyd, Chapman and Hall, New York.
5. Water quality in warm water fishponds. By: C.E. Boyd, Chapman and Hill, New York.
6. Biology of finfish and shellfish. By: S.L. Chonder, SCSC publishers.
7. Inland fishes. Vol. 1 and Vol 2. By: P.K. Talwar and A. G. Jhingran. Oxford and IBH publishing Co. Pvt. Ltd., New Delhi.
8. Fish and fisheries of India. By.: V. G Jhingran. Hindustan Publ. Co.
9. Aquaculture : farming aquatic animals and plants. By. John S. Lucas and Paul C. Southgate, Blackwell Publishing.
10. Intensive fish farming By: Jonathan shepherd and Niall Bromage, Oxford publishing.
11. Textbook of fish disease. By: D.A. Conroy and R.L Herman. Narendra publishing house, Delhi.
12. Fish nutrition. By: J.E. Halver and R.W. Hardy. Academic press, New York.
13. A hatchery manual for the common, Chinese and Indian Major carps. By: V.G Jhingran and R.S.V. pullin.
14. Advances in fish processing technology. By: D.P. Sen. Allied Publ. Pvt. Ltd. New Delhi.
15. Fish processing technology. By: T.K. Govindan. Oxfore & IBH Publ., New Delhi.
16. Economics of fisheries management By: R. Korakard. Daya Publ. House. New Delhi.
17. Economics in commerical fisheres. By: K.P. Biswas. Daya Publ. House. New Delhi.
18. Freshwater aquaculture. By: R.K. Rath, 2nd Edn. Scientific Publ., Jodhpur.
19. Aquatic pollution and management. By: B.C. Mohapatra and C. Saha. CIFA, Bhubaneswar.

FIRST YEAR
CROP PRODUCTION
Paper - I (Theory)

Full Marks - 50

(Weekly Two period Total= 68 periods per year) **Time = 2.30 hrs**

A. Soil and its properties

Soil as a medium for plant growth.

Soil formation, soil profile, morphological features.

Volume composition of soil - four major components.

Mineral matter - soil separates, their properties.

Soil organic matter and its properties, soil microoganisms and its role in soil.

Soil physical properties - Soil texture.

Different types of texture affecting physical properties of soil.

Soil structure and structural management.

Soil air and its role for crop and microoganisms and soil physical properties.

Soil temperture and its role in crop growth and development.

Soil water, its retention, movement and availability to plants.

Chemical properties of soil - soil colloids cation exchange capacity (CEC).

Soil PH (Soil reaction) and availability of nutrients to plants.

Saline and alkaline soils and their management.

Broad soil groups of Orissa, their characteristics and management.

(B) Soil fertility and productivity

Concept of soil fertility and productivity and their management for improving crop production.

Essential elements : Macro and micro nutrients, their role in plants and deficiency symptoms. Sources of their availablity and utilisation for crop production. Nutrient gain and loss and their remedial measures. Soil testing as a tool to assess soil fertility. Soil fertility maps of Orissa, measures to improve soil fertility. Nutrient recommendation on the basis of soil fertility for different crops.

(C) Manures, Fertilizers and soil amendments :

Organic manures -

Bulky organic manures - FYM, compost, green manure, crop residue, biofertilizers, concentrated organic manures- oil cakes their nutrient content and use for field crops.

Chemical fertilizers : Straight and complex, mixed fertilizers and their nutrient content, their suitability for different soils and crops. Calculation of fertilizer requirements for different crops.

Secondary and micronutrient carriers, their sources of availability and recommended doses for major crops, Fundamental of fertilizer application and recommended doses for major crops, principles of fertilizer application, quanitity, time and methods of application.

Soil amendments and their application, Reclamation and management of acid, saline and alkaline soils.

(D) Soil conservation : Soil erosion - water erosion, types of water erosion and their effect.

Wind erosion and their effect.

Problems created due to soil erosion and remedial measures.

Soil conservation - physical, mechanical and biologycal measure of soil conservation. Wastelands and their management.

Soil conservation practices and watersheed management.

FIRST YEAR
CROP PRODUCTION
Paper - I (Practical)

Full Marks - 50

(Weekly two classes Total= 68 clases per year) **Time = 2.30 hrs**

Study of soil profile in the field. Procedure for collecting soil samples in the field, filling up of information sheet, drying and despatching the sample for analysis.

Study of the soil physical properties - determination of texture, structure, bulk density and pore space.

Determination of maximum water holding capacity, field capacity and wilting point.

Determination of soil pH by indicator method. Use of soil testing kit for testing of soil pH and conductivity.

Determination of lime requirement soil.

Interpretation of soil test report and recommendation.

Computation of does of fertilizer for different crops from soil test value.

Identification and computation of dose of soil amendment, identification of fertilizers, biofertilizers and their application.

Methods of fertilizer application.

Urea Prilled and foliar spay of urea.

Study of deficiency symptoms of nutrient in field crops and collection of plant samples for laboratory diagnosis.

Preparation of FYM / Compost

Seed innoculation with hizobium culture.

Visit to soil conservation farms to study conservation measures.

Visit to watershed areas to study the watershed programme.

FIRST YEAR
CROP PRODUCTION
Paper - II (Theory)

Full Marks - 50

Time = 2.30 hrs

(Weekly two periods, Total= 68 periods per year)

Elementary agronomy

Weather and climate : Elements of weather and climate, factors of climate crop weather relationship, weather in relation to occurrence of crops pests and diseases, weather forecasting, climate of Orissa and agro-climatic zones and their characteristics in relation to rainfall, temperature, soil types and major crops grown, area / districts under each zone. Agroclimatic zones of India with reference to such characteristics.

Cropping system, classification of crops, monocropping, multiple cropping, crop ratation, mixed cropping, inter cropping and relay cropping. Cropping intensity, cropping scheme, calendar of operation, distribution of crops in Orissa under different agroclimatic zones. Dry farming technology.

Tillage : Types of tillage, objectives of tillage, tillage requirement of different crops, characteristics of good seedbed, tillage implements, ploughs, cultivators harrows, seed drill, seed-cum fertilizer drill, inter culture, harvesting and threshing implements.

Seeds : Characteristics of good seed, types of seed, seed viability, moisture, germination and purity testing.

Seed dormancy and methods to break dormancy.

Water management : Importance of irrigation and drainage, irrigation potential created and utilization in Orissa, consumptive use, water and irrigation requirement of crops, factors affecting irrigation requirement, methods of irrigation, quantity of irrigation, irrigation appliances, irrigation scheduling for different crops, water logging, its causes and effects, types and methods of drainage.

Weed control : Definition and classification of weeds. crop and weed competition, losses caused by weeds, principles and methods of weed control, cultural, mechanical, chemical and biological methods of seed control. Classification of hericides, their application schedule for different crops, integrated weed management.

Rural Development : Integrated Rural Development Programme (IRDP).

Aims and objectives of IRDP, beneficiaries of IRDP, planning for IRDP and other related programmes.

Training of Rural youth for self employment (TRYSEM), its objectives and organization in rural development.

Development of women and children in rural areas (DWCRA) its objectives and importance.

Coverage of health programmes under DWCRA. Education and information dissemination programme for the DWCRA groups.

Panchayat Raj, Gram Panchayat acts, rules and elections, pension, insurance and social security schemes, Jawahar Rojgar Yojana, Cooperative institutions, their role in rural development, Monitoring and evaluation of rural development programmes.

FIRST YEAR
CROP PRODUCTION
Paper - II (Practical)

Full Marks - 50

Time = 2.30 hrs

(Weekly one classes Total= 34 clases per year)

Study of crop weather observatory, identification and use of meteorological equipments, preparation of temperture, rainfall and humidity maps of Orissa,

Identification and study of primary, secondary and intertillage implements in the field.

Identification of crop plants and their seeds, seed treatment, and seed innoculation. Preparation of cropping scheme cropping pattern, crop rotation and calendar of operation for different crops, Germination and purity test of seed.

Identification of weeds associated with upland, medium land and lowland crops. Preparation of herbicide spray solutions and methods of their application. Mechanical and chemical methods of weed control.

Lay out of different methods of irrigation, and their field demonstrations, operationand maintenance of water pumps.

IRDP survey, filling up application forms and their processing. Group study in TRYSEM. Study of the problems of women in rural areas. Visit to successful DWCRA Groups. Maintenance of Panchayst records. Implementation of different pension schemes.

Implementation of JRY and ICDS.

Visit to primary Aagriculture cooperative societies in rural areas and study about their practical functioning.

Study of different rural development programmes and record keeping.

SECOND YEAR
CROP PRODUCTION
Paper - I (Theory)

Full Marks - 50

Time = 2.30 hrs

(Weekly two period Total= 68 periods per year)

Distribution, climate / season, soil, variety, seed treatment, seedbed preparation, time and method of sowing, nursery management, seedrate, specing, manure and fertilizer application, interculture and weed control, irrigation, plant protection, harvesting and threshing, storage and economics of production of the following crops,

Cereals and millets : Rice, Wheat, Maize, Jowar, Bajra, Ragi.

Pulses : Greengram, Blackgram, Arhar, Horsegram, Cowpea, Bengalgram, Fieldpea, Lentil.

Oilseeds : Groundnut, Rapeseed and Mustard, Sesamum, Niger, Castor, Sunflower, Safflower, Soyabean, Linseed.

Fibre crops : Jute, Mesta, Sunhemp, Cotton.

Sugar crops : Sugarcane.

Fodder crops : Maize. Jowar, Teosinte, Oat, Cowpea, Berseem, Lucern, Paragrass, Sudangrass, Guineagrass, Napier, Guar.

Horticulture and post Harvest Technology

Importance and scope of Horticulture and its role in human nutrition. Basic concepts, principles and methods of plant propagation, plant propagation structures, media, stock-scion, relationship, nursery technique of raising vegetable seedlings and fruit nursery.

Different cropping systems, Fruits and Vegetable,nutrient content of fruits and vegetables and their use of human nutrition. Gardening, prunning and training,

Study of origin, distribution, soil, climatic requirements, propagation, varieties, planting methods, training and prunning, manuring and fertilizer application, irrigation, interculture and weed control, pest and disease control, interculture and weed control, pest and disease control, harvesting and yield of major fruit crops (Mango, Jackfruit, Banana, citrus, guava, papaya, litchi, pineapple, sapota, ber etc)

Plantation crops - Rubber, cashew, coconut, mulberry, and coffee, Vegetables (Brinjal, tomato, potato, okra, cucurbits, onion, beans, colecrops, root vegetables) and spices (chilli, turmeric and ginger).

Principles and methods of fruits and vegetable preservation.

Post harvest handling of horticultural crops including grading, packing, transport, marketing, and storage of horticultural produces.

SECOND YEAR
CROP PRODUCTION
Paper - I (Practical)

Full Marks - 100

Time 4 hrs

(Weekly two classes Total= 68 classes per year)

Identification of crop plants at different stages of growth. Identification of varieties and seeds.

Preparation of nursery and seed bed, seed treatment and sowing of seed by different methods - broadcasting, dibbling, drilling, transplanting (paddyand Ragi)

Seed treatment with fungicides, rhizobium culture and biofertilizers.

Intercultural operations, weeding, use of herbicides and preparation of herbicide spray solutions, Study of the function of different parts of sprayer and spraying operation in the field.

Preparation of cotton seeds for sowing, treatment of sugarcane sets before sowing / planting, retting operation of jute, calculation of cost of cultivation of different field crops.

Identification of major horticultural crops, varieties, vegetable seeds, graden implements. Practical work for orchard layout, and lawn making, propagation method, technique and management of fruit nursery. Germination and testing of seed, calculation of seed rate.

Manuring and other culture operations, raising vegetable crops in the student demonstration plot, their care and disposal.

Identification of important pests and diseases of major fruits and vegetables in the field.

Packing and grading of fruits and vegetables and their market study.

Visit to horticultural farms and study of their activities on vegetables and fruit crop raising and interaction with them.

Visit to different agricultural farms and soil testing laboratories, maintence of records and observations.

SECOND YEAR
Paper - II (Theory)

Full Marks - 50

Time = 2.30 hrs

(Weekly two period Total= 68 periods per year)

Plant protection:

Importance of plant protection in agriculture, enemies of crop plants i.e. insect pests and diseases of different crops (cereals, pulses, oilseeds, sugarcane, jute, cotton, vegetable, fruit crops) and store grain pests, their damage and control measures.

Integrated insect pests and disease control.

Common plant protection chemicals, insecticide and fungicides; their formulation methods of use and, safe handling. Plant protection equipments, their use and maintanance.

Sericulture : Types of silkorm, reasing of silkworm properties of silk, extraction and reeling.

Bee keeping : Importance of bee keeping, caste system in bees. Bee-hives and bee-keeping equipments, establishment and management of apiary of Indian and Italian bees.

Mushroom cultivation for domestic and commercial purpose.

Animal Husbandary and Pisciculture :

Breeds of cattle : Indigenous and exotic breeds that have been introduced for upgradation.

Management of dairy animals, care of new borne calves.

Milk cows / pregnant cows :

Cow after pasturition, care of heifer bull calves, care of bullocks, care of sick animals.

Byre implements / equipments. Ideal ration for cows, preparation of silage.

Basic ideas about common diseases of diary cattle with emphasis on preventive measures.

Anthrax, Haemorrhagic septicaemia, Black quarter, Foot and mouth disease, mucosal disease complex, Ephemoral fever, Round worm,Hookworm, liver flukes, Tapeworm, coccidiosis, Johnes disease, tuberculosis, Mastitis, milk fever, Downer cow syndrome, Hypomagnesemia, Tick infestation, Mineral and Vitamindeficiency.

Poultry farming :

Common poultry breeds, poultry housing, poultry equipments care and management of poultry, common diseases of poultry-

bacterial :

- Fowl cholera
- Pullorum disease
- Botulism
- Avian tuberculosis

Viral :

- New castel disease (N.D) / Ranikhet disease
- Avian influenza (Fowl plague)
- Avian lucosis Complex (ALC)
- Marek's Disease (M.D)
- Infectious bursal disease (IBD) / Gumboro Disease
- Infectious bronchitis (IB)
- Fowl pox

Fungal :

- Aspergillosis (Brooder pneumonio)
- Candidiasis
- Aflatosicosis

Parasitic :

- Roundworm / other nematodes
- Protozoan disease of poultry (Coccidiosis)
- Nutritional/ Vitamin Deficiency

Goat farming :

- Common goat breeds for housing, their feeding and management, breeding for higher meet and milk yield
- Housing of the breeds and theirmanagement.
- Common important diaseases of goat and theirmanagement.
- Bacterial.
- Viral
- Helminthic

Pisciculture :

Common fish types suitable for rearing, reasing ponds, fish spawn and spawning, fish and artificial feeding, fish disease control, fish collecting equipments, harvesting, processingand fish byproducts.

SECOND YEAR
Paper - II (Practical)

Full Marks - 100

Time = 4 hrs

(Weekly two classes Total= 68 classes per year)

Identification and collection of insect pests of food crops i.e. cereals, pulses, oilseeds, sugarcare, vegetables and other crops like jute, cotton and store grain pests.

Identification of demaged plant parts by insects.

Preservation of insects in collection box (specimen collection box) and their identification and labelling.

Study of different insecticides and preparation of spray solutions.

Identification, collection and preservation of diteased.

plant samples and study of theircontrol measures.

Study of the fungicides and bactericides and their application in the field for disease control. Identification and collection of associated weeds of major field crops.

Preservation of weeds in herbarium and their identification.

Study of different herbicides, their dose and method of application to control weeds in field crops.

Practical knowledge of different types of plant protection equipments, their part and function and use of these equipment in the field.

Identification of different species of silk worms, rearing techniques of mulbery, silkworm and disinfection of raring houses.

handling of bee hives and bee keeping equipments, honey extraction methods, preservation of honey.

Preparation of mushroom beds and maintenance and spawning.

Identification of different breeds of cattle, casting and handling of animals, collection of seamen, study of artificial insemination (A.I) at nearby VAS centre.

Practice of castration and dehorning at nearby veterinary centre.

Identification of common feed and fodder, laboratory examination of urine, stool and blood, grooming and washing of animals.

Dentition and ageing, Disease diagnosis basing on clinical symptoms and its treatment.

Acquaintance with common veterinary medicine, methods of useof veterinary medicines, Vaccination programme, visit to dairy farm to study their management, identification and use of poultry equipments, incubation, hatching and breeding. Debeeking and vaccination. Formulation of rotation for chicks, broiler and layer birds.

Preservation of surplus eggs.

Identification of healthy and sick birds and their maintenance, Visit to hatcheries and poultry farms.

Identification of common fishes, visit to spawn collection centres.

Methods of spawning.

Application of artificial foods in rearing pond.

Acquaintance and use of fish collecting equipments.

Visit to fish farms.

Visit to nearby VAS centres for practical assistance, dairy farms and fishery extension units may be contacted.

M.L.T COURSE

FIRST YEAR

THEORY PAPER - I (68 PERIODS)

Section No.	Name of the Section	Period	Marks
1.	Human Anatomy	12	15
2.	Human physiology	10	15
3.	Laboratory Management & Ethics	07	10
4.	Statistics and aspects	05	10

HUMAN ANATOMY **50 Marks**

* Introduction

  Different parts of human body

  Anatomical position, Directional terms, Common Anatomical places.

  Systemic and regional anatomy,

* Histology

  Typical animal Cell-structure and functions. Tissues of the body classification and function.

* Skeletal system.

  Bones of the skull, vertebral column, shoulder girdle, thoracie cage and pelvic girdle.

  Bones of the limbs.

  Joints and movements

* Muscular system

  Types of muscles

  Principle muscles of the body, tendons, fascias.

* Nervous system, central Nervous system, Brain Meninges, CSF. Spinal cord,

  Peripheral nervous system cranical, spinal nerves system, Autonomic nervous system, Sympathetic and para sympatghetic.

* Cardiovascular system

  Heart.

  Blood Vessels

* Lymphatic and RE system, Spleen,

* Respiratory system,

Nose, Pharynx, Larynx, Tonsils,

Trachea, Bronchi,

Lungs and Pleura.

* Alimentray System

Mouth and Oesophagus

Stomach

Pancreas, liver and gall bladder.

Intestines, Peritoneum

* Urinary system

Kidneys,

Ureter, Urinary bladder and Uretnra

* Reproductive e system

Male genital system

Femal genital system and accessory ovgans.

* Skin

* Special Senses

Eye and vision

Ears and hearing, equilibrium

Taste ; Smell; General Sensibility viz. touch etc. surface anatomy.

* Head and neck

Thorax (heart and lungs) and abdomen (stomach, spleen liver, kidney and bladder)

Places and regions of abdomen and location of different organs in stomach.

Surface marking of important blood vessels, nerves and muscles for injection

HUMAN PHYSICLOGY

* Blood

Composition and general functions of blood.

Description of blood cells-normal counts and functions steps of coagulation,

Anticoagulants.

cerebrospinal fluid, formation, composition and function. Blood groups ABO and RH, basis for

classification, importance of blood groups. Compositions and functions of lymph.

* Respiratory system

  Name and structures involved in respiration and their function. External and internal respiration. How inspiration expiration are brought about.

  Transport of O_2 and CO_2 in the blood.

  Definition of respiratory rate, Tidal volume, vital capacity.

  Hypoxia

* Excretory system

  Functions of kidney

  Nephron - Functions of glomerulus and tubules, Composition of Urine, normal and abnormal.

* Skin - Functions of Skin.

* Digestive systems

  Composition and functions of saliva, mastication and deglutition. Functions of stomach, composition of gastric juice, pancreatic juice, Bile and Success enteritis.

  Digestion of food by different enzymes, Absorption and defecation.

* Endocrine - glands

  Defination of endocrine gland, Name of the endocrine glands and the hormones secreted by them.

  Major actions of each hormone.

  Reproductive system.

  Name of primary and accessory organs in male and female. Name of secondary sexual characters in male and female. Functions of ovary-formation of ova, actions of ovarian hormones Menstrual cycle.

  Function of Testis - Spermatogenesis and actions of Testosterone, Fertilisation.

  Vasectomy and Tubectomy.

Note : The teaching of Anatomy & Physiology should be Coordinated so that structure and functions of different parts of human body are correlated.

Only brief outline of the subject of be given.

LABORATORY MANAGEMENT AND ETHICS

10 Marks

1 Role of laboratory in health care delivery

- 1.1 General
- 1.2 Human health and diseases
  - 1.2.1 Types of diseases
  - 1.2.2 Process of diagnosis
- 1.3 Laboratory at different level.
- 1.4 Duties and responsibility of laboratory persons.

2. Laboratory services in the health delivery system in India.

- 2.1 Laboratory service in India.

2.2 The health administration system in India.

- 2.2.1 At the National Level.
- 2.2.2 At the State level.
- 2.2.3 At the District level.
- 2.2.4 At the Village level.
- 2.2.5 Voluntary health organizations in India.
- 2.2.6 Health programmes in India.

3. Laboratory Planning

- 3.1 General priniciples.
- 3.2 Laboratory goals.
- 3.3 Operational data
  - 3.3.1 Market potential.
  - 3.3.2 Hospital / Laboratory relatives.
  - 3.3.3 Competitions.
  - 3.3.4 Laboratory trends.
- 3.4 Planning at different levels.
- 3.5 Guiding principles for planning hospital Laboratory services.
  - 3.5.1 Factors.
  - 3.5.2 Guiding principles for planning.
  - 3.5.3 Functions criteria

3.5.4 Operational demand.

3.5.5 Sections of a hospital laboratory

3.5.6 Common areas.

3.5.7 Design aspect.

3.5.8 Space requirement.

3.6 Planning for 3 basic health laboratory.

STATISTICS AND GENERAL ASPECTS

10 Marks

TABULATION	:	Simple tables, Frequency distribution tables.
DIAGRAMS	:	Bar Diagram, Histogram, Line Diagram, Pie Diagram, Scatter or Dot Diagram.
STATISTICAL AVERAGES	:	Mean, median, mode.
MEASRES OF DISPERSION		:Normal curve, range, Standard Deviation, Standard Error.
TEST OF SIGNIFICANCE	:	't' Test.

FIRST YEAR
THEORY PAPER - II (68 Periods)

50 Marks

Section	Name of the Section	Periods	Marks
1.	Biochemistry		10
2.	Clinical Biochemistry		10
3.	General priniciples of laboratory technology		10
4.	Clinical pathology		10
5.	Computer and general practice		10

BIOCHEMISTRY

10 Marks

1 Inorganic and physical aspects of biochemistry, Structure of atoms, symbol, valency and formula.
Chemical units - Atomic weight, molecular weight, gram mole Equivalent weight, gram equivalent.
Fundamental laws of Chemistry
Acids, bases and salts.
Hydrogen concentration and pH Measurement - Indicators and pH meter,
Buffers, preparation
Solutions - solute and solvent, saturated solutions, solubility Temp. effects.
Concentrations of Solutions in different ways viz molar normal percentage etc.
Simple qualitative analysis - Cations Anions.
Volumetric (Titrimetric) analysis
Primary and Secondary Standards,
Acid-base titrations, permanganometry,
Rules in Volumetric analysis.
Isotopes definition / examples / uses.

2. Chemistry of Bimolecular - Carbohydrates, Lipids, Amino- acids, Proteins, Nucleic acids, Vitamins.
3. Isotopes.

CLINICAL BIOCHEMISTRY

PART - I

10 Marks

1 Bioenergetics - Respiratory Chain, Oxidative, Phosphorylations
2. Overview of Metabolism
3. Carbohydrate Metabolism
   - Glycolysis and TCA Cycle.
   - Blood glucose homeostasis.
   - Measurement of blood glucose.
   - Glycosuria, Diabetes mellitus.

4. Lipid Metabolism
   - Cholesterol,
   - Triglycerides
   - Lipoproteins
   - Ketone Bodies - formation, Ketosis, ketonuria
5. Amino acid & Protein metabolism
   - Urea synthesis - Uraemia
   - Other nonprotion nitrogenous compound like vaginate Uvicacid.
   - Biochemical veactions of aminoacidsTransamination, Deamination.
   - Synthese of physiologically important substances from aminoacids.
6. Metaboilic inter-relationships
7. Principles og Inborn Errors of Metabolism.
8. Water, Na+K+and CI, Bicarbonates, Acid Base Balance, calcium and Phosporous.
9. Role and Iron, Iodine and other Trace elements.

PART - II

Organs Function Tests.

1 Endocrine Function Tests - Thyroid Function Tests.
2. Biochemical Tests of CSF.
3. Renal Function Tests 24 hr. collection, preservation, physical characteristic, clearance Tests.
4. Liver function tests.
5. Gastric Function Tests.
6. pancreatic function Tests-Serum Amylase Serum
   Trypsin Serum Lipase, D-xylose.

PART - III

Clinical Enzymology & Organisation

Funamental of Analytical Biochemistry & Instrumentation.

1 Clinical Enzymology - Diagnostic enzymes, Isozymes.

2. Fundamental of Analytical Biochemistry & Instrumentation.
   - Analytical balances
   - Centrifuges
   - Colorimeter and spectrophotometer
   - Flame photometer
   - Auto analysers
   - Chromatography
   - Electropohresis

GENERAL PRINCIPLES OF LABORATORY TECHNOLOGY

10 Marks

- Role of laboratory in health care delivery-Human health and diseases.
- Role of laboratory in diagnosis of disease in healh delivery system.

  Duties and responsibility of laboratory personal.
- Laboratory services in the health delivery system in India.
- Laboratory Planning

  General Principles

  Laboratory goals

  Operational date

  Guiding principles for planning hospital laboratory services particulary for basic health laboratory.
- Laboratory organisation

  General principles

  Components and functions of a laboratory

  Staffing the lobaoratory

  Job description-Job specifications

  Work schedule - Personnel rearrangement and work load assessment.
- Care of laboratory glassware, equipments and chemicals verbal.
- Principles - Different types of glassware and plastic ware.

  Care and cleaning of glass wares.

  Making simple glasswares in the laboratory.

  Care of equipments and apparatus.

Laboratory chemicals, their proper use and care, storage

Labelling.

- Specimen handling

Collection techniques and containers for specimen collection

Types of specimen.

Entry, handling

Specimen transport

Specimen disposal

Specimen preservation

- Laboratory Safety

General principles

Laboratory hazards

Safety programme

First aid

Safety measure - Mechanical, Electrical, Chemical

Biological & radioactive

- Communication : Personnel Development and Relations,general principles.

Inter/intra departmental communications request / Report forms.

- Basic Principles of quality Control.

General Principles.

Non-Analytical functions

Request Specifications.

Specimen Specification.

Distribution of tests.

Analytical function

Methods, Equipment, Reagents and material Controls, Proficiency testing.

Meterials Management

General Principles

Ethics

General Principles

Professional ethics including code of conduct relationship with doctors and fellow technicians.

Use of kits and cost control.

Maintenance of Secrecy of Lab data

CLINICAL PATHOLOGY

10 Marks

1 Urine analysis
Physical, Chemical, Microscopic

2. Faecal analysis
Physical
Chemical - Occult blood Exam.
Microscopic

3. Sputum analysis - Physical and microscopic

4. Seminal Fluid analysis

5. Examination of aspiration fluid.
Ascitic fluid
Pleural fluid
CSF
Others

6. Pregnanc`y tests.

COMPUTER AND GENERAL PRACTICE

10 Marks

- Computer : types, components - input, output and storage media, computer wares, necessary care for computers.
- Elementary knowledge of Data Processing and Word processing.
- Application of computers in Mediocine

FIRST YEAR

PRACTICAL - I (34 CLASSES)

50 Marks

Laboratory Management and Ethics

1 Cleanising of glasswares (Pipettes, Slides and Cover slips, Syringes and needles, blood cell diluting pipettes, glassware used for bacteria investigation)

2. Making simple glass items in the laboratory (pasture pipette. stirring bending glass and preparing a wash bottle.)

3. Demonstration of use and care of instruments, cautions precautions to be taken
4. Demonstration of safety measures during work in laboratory in various fields.
5. Demonstration of safe handling of speciments and infections agents including HBs Ag, (Hepatitis) and AIDs (HIV).

Specimen handing Collection, Preservation, Transportation, Disposal

Laboratory Safety & First Aid

Biomedical wasteManagement

Computer Application

FIRST YEAR

PRACTICAL - II (34 CLASSES)

50 Marks

Use of Microscope, care, Maintenance

Clinical Pathology

1 Routine analysis of Urine.
2. Analysis of faces including occult blood test.
3. Examination of sputum.
4. Seminal fluid analysis.
5. Analysis of aspiration fluid.
6. Pregnancy test - Urine for HCG

SECOND YEAR

THEORY - I (68 PERIODS)

50 Marks

Section No	Name of the Section	Periods	Marks
1.	Hematology Immunohematology and Blood Transfusion		20
2	Microbiology		15
3	Sociology		15

Hematology Immunohematology & Blood Transfusion **20 Marks**

1. Introduction to hematology
2. Collection of blood sample and anticoagulants.
3. Red Cell Counts
   a. Haemocytometer & Producer for R.B.C. count
   b. RBC diluting fluid
   c. Calculation
4. White Cell count
   a. Procedure for W.B.C. count
   b. WBC diluting fluid
   c. Caculation.
5. Differential White Cell count
   a. Morphology of white cell.
   b. Normal values.
   c. Romansky stains.
   d. Counting methods.
6. Absolute Eosinophil Count. Direct / Indirect.
7. ESR :
   Westergren's
   Wintroble's
   Factors affecting ESR
   Importance and Limitation
   Normal value and interpretation.
8. Packed Cell Volume (Haematocrit)
   a. Macro and Micro methods.
   b. Interpretation
9. Hemoglobin estimation
   a. Colorimetric method
   b. Shali's method
   c. Interpretation of result.

10. Red Cell indices

    Calculation and importance.

11. Reticulocyte Count

    Method - Interpretation.

12. Sickle Cell preparation.

13. Osmotic fragility test - Interpretation.

14. Estimation of G6 PD

15. Principle of electrophoresis

16. Preparation of bone marrow aspiration and trephine biopsy.

17. Coagulation test.

    - Bleeding time.
    - Whole blood coagulation time.
    - Clot retraction time
    - Prothrombin time
    - Platelet count.

18. Immunohematology and blood transfusion.

    a. Introduction

    b. Human blood group antigens.

    c. ABO blood group system.

    d. Rh blood group system and Incompatibility

    e. Technique of grouping and Cross matching

    f. Coomb's test

       Direct

       Indirect

    g. Blood transfusion procedure.

    h. Complication of blood transfusion.

    i. Blood collection.

       Selection and screening of donors.

       Collection of blood

       Anticoagulants.

       Storage of Blood

j. Cell separator and transfusion of various components of blood.

k. Organization, Operation and administration of blood bank.

MICROBIOLOGY AND SEROLOGY

SECTION - A

15+15 = 30 Marks

1 Introduction of Microbiology

- History, scope and definition.
- Microbes and their classification.
- Bacteria.
- Nutritional and growth requirements.
- Bacterial genetic & drug resistance.
- Bacterial Infection and Pathogen city.
- Culture media, their preprations & uses.

- Culture methods and identification of bacteria.
- Collection of clinical specimens for microbiological vestigations.

2. Sterilisation and disinfection :

(Physical, Chemical and Mechanical Methods, Sterilisation of media, syringes, glasswares etc. and disposal of contaminated media and other materials)

3. Laboratory Investigation in Baceriology :

- Uses of common laboratory equipments.

(Different microscopes incubator, Refrigerator & Deep Freeze, Hot air oven, Autoclave, Inspissator, Incinerator, Bacterial filter,water bath, VDRL rotator, anaerobic Jar Centrifuge, Vacuum pump, media pouring chamber, Elisa reader etc.)

- Methods of laboratory investigations.
- Study of morphology

(Hanging drop preparation & various Standingprocedures simple, differential and special stains)

- Different techniques of inoculation into culture media, sub-culture and maintenance of stock culture.
- Anaerobic cultivation.
- Culture of various clinical specimens in the Laboratory.
- Isolation and identification of Bacteria.
  (Culture Characters, biochemical reactions, serotyping and special tests)
- Antimicrobial sensitivity tests.
- Study of epidemiology and use of transport media.
  Bacteriological examination of water and milk etc.

4. Systemic Bacteriology :
   - Cocci : Gram positive (Staphylococci, Streptococci Pneumoocci etc,)
     Gram nagative (Neisseria group-Gonococci, Meningococci)
   - Bacilli : (Gram positive and gram negative bacilli)
     Corynebacterium
     Clostridium.
   - Nonsporing anaerobes
     Enterobactriacae
     (E, coli, Klebsiella & Coliforms, Proteus, Salmonella, Shigella etc.)
   - Vibrio
   - Pseudomonas
   - Pasteurella, Yersinia, francisella
   - Haemophilus Bordetella & Bovcella (Mycobacteria, tuberculosis, M Leprae etc.)
   - Miscellaneous bacteria.
   - Splirochaets (Treponema, Leptospira and Borrelia etc.)
   - Actinomycetes.
   - Rickettisiacae
   - Chlamydia
5. Medical Mycology :
   - Classification & Morphology of commom pathogenic fungi of medical impotrtance and diseases produced by them.
   - Laboratory diagnosis including culture of pathogenic fungi.

6. Immunology and Serology :

- Immunity - Basic principles & Classification.
- Structure & functions of Immune system and Immune response.
- Antigens, Antibodies (Immunoglobulins) and complement system.
- Antigen - Antibody reactions.

  (Agglutination, Precipitation, Complement fixation Nutralisation etc. and their applications in the diagnosis of disease).
- Hypersensitivity (Classification & skin tests used in diagnosis)
- Auto Immunity
- Immunology of Transplantation malignancy.
- Immunohaematology.
- Immunodeficiency diseases including AIDS.
- Immunoprophylaxis and Immunisation schedule

  (Vaccines classification & uses)

SECTION - B

Parasitology, Virology, Clinical Microbiology and Animal care

1 Parasitology :

- Introduction to Parasitology and classification of parasites of medical importance.
- Intestinal and tissue protozoa.
- Malarial parasities.
- Malarial parasities.
- Trypansomes.
- Leishmanial Parasites.
- Tape worms.
- Flukes of liver, intestinaltract and livings.
- Schistosomes
- Intestinal nematodes.
- Filarial worms and other tissue nematodes.

- Insect vectors of medical importance

(Flies, mosquitoes, fleas, bugs, lice, cokroaches) and Arachnids (ticks, mites, spiders, scorpions etc.)

- Zoonosis - their importance for human infections.

2. Virology

- General characters of viruses, classification, virus culture and isolation procedures.
- Common viruses of medical importance
- DNA viruses :

(Pox, viruses, harpies viruses, Adenovriouss, Papova viruses etc.)

- RNA viruses

(Toga viruses, Reviruese, Bunya viruses, Arena viruses, rhinoviruses, Rhabdo viruses, Paramyxo and orthomyxo viruses, Corona viruses, retroviruses.)

- Miscellaneous Viruses

(RNA & DNA viruses - Hepatitis viruses etc.)

- Oncogenic viruses
- HIV viruses and AIDs.
- Collection and Transport of Virological speciments.
- Laboratory diagnosis of viral infections.

3. Clinical Microbiology :

- Collection and transport of clinical specimens.
- Collection and preliminary processing of clinical specimens.
- Diagnostic Microbiology an approach to laboratory diagnosis of various infective syndromes.
- Normal microbial flora of the human body.
- Bacteriemia, Pyaemia and Septicaemia.
- Purexia of Unknown Origin (P.U.O)
- Respiratory tract Infections (Sore throat, Pneumonitis, Pulmonary tract Infections)
- Skin and subcutaneous tissue Inflections.
- Wound Infections.
- Meningitis

- Enecphalitis.
- Infective diarrhea.
- Food poisoning.
- Nosocomial infections.
- Opportunistic infections.

4. Animal Care :
   - Handling, feeding and breeding of laboratory animals.
   - Maintenance of sanitation and cleaning of cages.
   - Common Animal Inoculation tests for diagnosis of diaseases.
   - Procedures for drawing blood.
   - Postmortem and safe disposals.

SECOND YEAR

THEORY - II (68 PERIODS)

50 Marks

Section No	Name of the Section	Periods	Marks
1.	**Histotechnology**		**25**
2.	**Museum Study**		**10**
3.	**Laboratory management & ethics**		**15**

HISTOTECHOLOGY

1 Introduction

2. Cell Tissue and their function.

3. Methods of examination of tissues and cells.

4. Fixation of tissue :
   a. Classification of fixatives.
   b. Simple fixatives and their properties

5. Tissue processing :
    a. Collection of specimen
    b. Labeling and fixation.
    c. Dehydration
    d. Clearing
    e. Impregnation
    f. Embedding
6. Section cutting :
    a. Microtoes and microtome knives - sharpening of knife.
    b. techniques of section cutting
    c. Mounting of sections.
    d. Frozen section,
7. Staining :
    a. Dyes and their properties.
    b. Theory of staining
    c. Staining techniques with haemotosyline and eosin.
    d. Mounting of sections.
    e. Common special atains
8. Decalcification :
    a. Fixation.
    b. Decalcification
    c. Detection of end point
    d. Neutralization and processing
9. Exfoliative Cytology & Fine needle aspiration cytology :
    a. Types of specimens and preservation
    b. Preparation and fixation of smears.
    c. Papanicoaous stating technique / MGG staining / HE staning
    d. Sex chromatin staining.
10. Museum Techniques :
    a. Reception of specimen.
    b. Preparation of fixation

c. Preservation

d. Presentation

11. Autopsy techniques.

Assisting in autopsy

Preservation of organs and

Processing of the tissue.

12. Waste disposal and safety in laboratory.

MUSEUM STUDY

10 Marks

1 Necessity of Museum.

2. Preservation & storage of specimen.

3. Arrangement & Display.

4. Proper care & maintenance.

LABORATORY MANAGEMENT AND ETHICS

15 Marks

1 Role of laboratory in health care delivery

1.1 General

1.2 Human health and diseases

1.2.1 Types of diseases

1.2.2 Process of diagnosis

1.3 Laboratory at different level.

1.4 Duties and responsibility of Laboratory persons.

2. Laboratory services in the health delivery system in India.

2.1 Laboratory services in India.

2.2 The health administration system in India.

2.2.1 At the National level.

2.2.2 At the State level.

2.2.3 At the District level.

2.2.4 At the Village level.

2.2.5 Voluntary health organization in India.

2.2.6 Health programmes in India.

3. Laboratory planning

3.1 General principles.

3.2 Laboratory goals.

3.3 Oprational data

3.3.1 Market potential.

3.3.2 Hospital / Laboratory relatives.

3.3.3 Competitions.

3.3.4 Laboratory trends.

3.4 Planning at different levels.

3.5 Guiding principles for planning hospital Laboratory services.

3.5.1 Factors.

3.5.2 Guiding principles for planning.

3.5.3 Function criteria.

3.5.4 Oprational demand

3.5.5 Sections of a hospital laboratory.

3.5.6 Common areas.

3.5.7 Design aspect

3.5.8 Space requirement.

3.6 Planning for 3 basic health laboratory.

SECOND YEAR

PRACTICAL - I (68 CLASSES)

100 MARKS

Section No	Name of the Section	Marks
1.	Heamatology	20
2.	Immuheamatology	20
3.	Blood Transfussion	20
4.	Histotecholongy	30
5.	Museum Study	10

HEAMATOLOGY	20 Marks
IMMUHEAMATOLOGY	20 Marks
BLOOD TRANSFUSSION	20 Marks

1 Use of Microscope, Care and Maintenance

2. Haemoglobin estimation - Sahlis

3. Haemoglobin demonstration of Colorimetric Hb estimation

4. Total RBC count.

5. Total Leucocyte count.

6. Differential count of Leucocyte.

7. Reticulocyte count.

8. Total platelet count

   Direct

   Indirect

9. Absolute Eosinophil count

   Direct

   Indirect

10. Bleeding time and clotting time.

11. Examination of Blood for parasites.

    - Malaria Parasite
    - Microfilaria.

12. Prothrombin time - Demonstration
13. ESR - Westergren's and Wintrobe's
14. PCV (Haematocrit)
15. ABO - Blood grouping : slide technique

    Tube technique.
16. Cross-matching
    - Major cross matching
    - Minor cross matching
17. R-typing
18. Coomb's test

    Direct

    Indirect
19. Donor Screening and Selection
    - Identification
    - Recording
    - Hb-estimation
    - Tulingout transfusion
    - Transmission disease

      STD, Malaria

      Hepatis - B

      AIDS
    - Grouping and Typing of doner's blood
20. Drawing of Blood - Asepsis, reassurance Venepuncture Collection and Care of doner.
21. Blood storage.
    - Anticoagulant preparation.
    - Recording the details and storage of blood
    - Maintence, cleaning of various equipments used in the blood bank.

HISTOTECHOLONGY

30 Marks

1 Fixation, processing, embedding and section and preparation of slides.

2. Sharoening of the knife.

3. Preparation of fixatives and decalcifying fluid.

4. Preparation of adhesives to fix the section to the slide.

5. Preparation and fixation of cytology smears and parnicolous staining techniques MGG staining / HE staining

MUSEUM STUDY

10 Marks

1 Necessity of Museum.

2. Preservation and storage of specimen.

3. Arranfement and display.

4. Proper care and maintenance.

SECOND YEAR

PRACTICAL - II

100 Marks

68 classes

Section No	Name of the Section	Marks
1.	Clinical Microbiology	40
2.	Parasitology	20
3.	Virology	20
4.	Animal care	20

CLINICAL MICROBIOLOGY

40 Marks

- Diagnostic microbiology - as an approach to various Infective syndromes.
- Collection, processing and transport of clinical specimens.
- Techniques of collection of blood, serum, CSF, Urine, Stool, Smears, Swabs etc., for microbiological diagnosis.
- Investigation procedures in various epidemics,commonly encountered.
- Gastroenteritis.
- Cholera
- Food poisoning
- Meningitis
- Encephalitis
- Continued fever and P.U.O.

  Investigation procedures for study of nosocomial infections.

PARASITOLOGY

20 Marks

1 Collection, Preservation and transportation of faecal materials for examination of parasites :

-Saline and iodine preparations of faeces for identification of cysts, ova, parasites, other cells like RBC,

Pus cells, Macrophages, bacterial and fungal study.

- Concentration techniques for faecal examination

2. Identification and Preservation of different parasites.
3. Identification of Different Insect vectors.
4. Museum study - demonstration of common parasites and different lesion produced by them in different organs and viscera.
5. Blood smear Examination for identification of malaria parasites L.D. Bodies.
6. Demonstration of interesting slides and Tissue section on Parasitology.

VIROLOGY

20 Marks

- Tissue culture techniques
  (Demonstration of CPE etc.)
- Embryonated egg. Inoculation.
- Various serological tests for diagnosis for viral diseases.
- HIV surveillance laboratory

ANIMAL CARE

20 Marks

- Handling
- Feeding, breeding, maintenance of sanitation etc.
- Drawing of blood.
- Common Animal; Inoculation tests used for diagnosis.
- Postmortem and safe disposal

Bacteriology, Mycology, Immunology and Serology

1. General introduction.
   - Code of conduct for Medical Laboratory personal.
   - Safety measures in the laboratory
   - First Aid in laboratory accidents and general precautionary measures.
2. Laboratory instruments and Equipments.
   2.1 - Handling and care of different microscopes with special application techniques like -
   - Phase contrast illumination
     Dark ground illumination
   - Fluorescent Microscopy
   - Principles of Electron Microscopy

(Demonstration if necessary)

2.2 - Operation and Maintenance of -

- Autoclave and Hot air over,
- Inspissator Bacterial filters including sets 3 filters.
- Arnold's sterilliser

  Media pouring chamber
- Incinerator
- Incubators (different types)
- pH meter
- Lovebird comparator
- Distillation plant
- Vacuums pump
- Analytical Balance
- Centrifuges (different types)
- Refrigerator
- Deep freezer
- VDRL Rotator
- Khan shaker
- Specilised equipments like
- Elisa Reader
- Electrophoresis apparatus,
- Immune electrophoresis
- Photo electric colorimeter
- Spetro photometer
- Laminar flow cabinet with ultra violet light

  (demonstration if necessary)

2.3 - Anaerobic jar and other methods of anaerobic culture.

3. Sterilisation methods in details with Quality control Measures
4. Care and cleaning of all glass wares like.

   (Test Tubes, slides, petri dishes, pipettes, beakers, flasks, bottles, funnels, syringes etc.)

preparation of pasture pipettes and sealing of Ampoules etc.

5. Collection of clinical specimen's like Blood, Urnie, stool,CSF, Bone marrow, sputum, aspiration of fluids and exudates, swabs etc. and use of transport media.
6. Receipts, labeling and recording of clinical specimens and dispatch to reference laboratories.
7. Reporting of laboratory tests and keeping records after final computerization.
8. Conversant with S.I unit system (System international d' unities) for reporting.
9. Conversant with Fundamental Chemistry i.e. use of Indicators, Strength of a solution, percent solutions, partdilutions moral solutions, normal, solutions etc.
10. Various media for culture -
11. Various staining Techniques like
    - Gram's stain - Z.N. stain
    - Albert's stain Neisser's stain
    - Negative Capsular staining
    - Spore staining - Lactophenol Cotton blue staining for fungi.
    - Leishman and Giemsa stains
    - Other special stains

    (Demonstrations if necessary)
12. Wet preparations like
    - Hanging drop preparation
    - Saline preparations
    - KOH preparation for fungi
13. Inoculation of clinical specimen into media and various techniques.
14. Isolation of Micro-organism in pure culture.
15. Identification of Micro-organisms by :
    - Study of morphology
    - Culture characteristics,
    - Various biochemical tests of common microorganisms.
    - Slid agglutination and other confirmatory tests.
16. Maintenance and preservation of stock cultures.
17. Antimicrobial (Drug) Sensitivity Tests.
18. Bacteriobial examination of water, milk and air.

19. Safe disposal of all culture media, syringes, needless, clinical specimens and all contaminated materials.
20. Study of different fungi by wet preparation, staining and culture Demonstration of use of BOD incubator.
21. Common (Serological Tests)
    - Widal test preparation of Salmonella antigens.
    - V.D.R.L. test
    - Brucella agglutination test
    - Latex agglutination test
      (RA, CRP, ASO, Australis, Antigen, Toxoplasmosis, Pregnancy tests etc.)
    - Coomb's tests
      Haemagglutination test and blood grouping.
    - Paul Bunnel test
    - weil Felix tests
    - Sel diffusion Techniques
    - Immuno electrophoresis.
      Assay of Immunoglobulins.
    - ELISA Test.
    - Radio Immuno Assay etc.
      (Demonstration if necessary)
22. Common dignostic skin Tests
    - Tuberculin (Mantous test)
    - Lepromin Test.
    - Casoni's Test
    - Other skin Tests for diagnosis of bacterial, fungal and parasitic diseases.
23. Urine Examination - Routine & Microscopic
    - Bacterial count.

AUDIO VISUAL TECHNICIAN (AVT)

THEORY

1st Year	Paper - I	Basic Electrical & Electronics	**FM - 50**
	Paper - II	Measuring Instruments, Radio & Tape Recorders	**FM - 50**
2nd Year	Paper - I	TV, VCR & CCTV Systems.	**FM - 50**
	Paper - II	Still & motion Photography, Video graphy	**FM - 50**

PRACTICAL

1st Year	Paper - I	Relating to Paper - I	**FM - 50**
	Paper - II	Relating to Paper - II	**FM - 50**
2nd Year	Paper - I	Relating to Paper - I	**FM - 100**
	Paper - II	Relating to Paper - II	**FM - 100**

BASIC ELECTRICAL & ELECTRONICS

FIRST YEAR

(Theory) Paper - I

Time: 2.30 hrs

Total - 68 periods

1. Hand Tools

Simple hand tools. Soldering Iron of various types, proper uses and maintenance. De-soldering tools. Common tools used in serving work.

2. Basic Electricity

Sources of voltage AC and DC voltages, concept of phase, frequency, R.M.S, average values, batteries. Ohm's Law, Kirchoff's Law, Series., Parallel and combination circuits of resistors, capacitors and inductors, Series and Parallel resonant circuits. Magnetism, Electromagnetic Induction, Transformers and Basic principles of Electric Motors.

3. Basic Electronics

Working principles of semiconductor devices. PN junction, Transistors symbols, specifications, concept of Biasing and stabilisation.

Rectifiers - half wave, full wave, centre tap & bidge types, filter circuits.

Power Supply regulators - Zenner & transistor regulation. IC regulator - 78XX, 79XX (Series)

SMPS (Block Diagram & Working Principles),

Amplifiers Classification - audio amplifiers, voltage and power amplifiers, RC coupled amplifier, transformer coupled amplifier.

RF amplifier - typecal circuits used in radio receivers.

Oscillators - typical circuits used in AV equipment.

Microphones, pickups, loudspeakers, Impedance matching.

4. Opto Electronics

Basic principles of Optics & Opto Electronics, Electronic devices like photo cells etc.

5. Optics

Lenses (Concave, Convex, Planoconcave), formation of images, focal length application for projectors Mirrors and their applications.

MEASURING INSTRUMENT, RADIO AND TAPE RECORDERS

FIRST YEAR

(Theory) Paper - II

Time: 2.30 hrs

Total - 68 periods

1. Measuring Instruments

Principles and uses of voltmeter, ammeter & multi meter (Digital & Analog). Block diagram of CRO and measurement of frequency, phase and amplitude, conmcept of decibel (DB).

2. Radio & Tape Recorders & PA System

Radio-block diagram, test points in a radio receiver (AM & FM). familiarisation typecal radio receiver. Concept of IF alignment in a radio receiver.

Working of a tape recorder,mechanical systems of a tape recorder, sound inputs for tape systems and PA system, accessories for tape recording systems.

Recording tape, specifications and recording directions. Spereophonic recording and playback equipment. Study of specific tape player systems and combinations like radio-tape-record players. Use of strobe disc, types of clearance and their applications. Methods of cleaning and safety precautions.

TV, VCR AND CCTV SYSTEMS

SECOND YEAR

(Theory) Paper - I

Time: 2.30 hrs

Total - 68 periods

1. Television

Block diagrams of a TV receiver (monochrome) & its Principles of operation of eack block.

Colour TV Receiver - NTAC, PAL, SECAM system.

PAL encoder decoder

Colour TV monitor-Shadow max, trinitron, concept of LCD & Plasma.

Remote Control

Installation of Boster & Antenna, Safety precautions in a TV receiver.

2. CCTV, VCR System

Principle of operation with Block diagram of a CCTV system. Setting of a CCTV system with multi monitor & multi camera.

Block diagram of a VCR. Operation and control of a VCR.

Illumination and lighting arrangements for video recording Camera light (Day light, Artificial light). Types of lamps and lighting level, Roll filling.

Safety precaution for CCTV and VCR systems.

Tape loading and storage for video tape and VCR

Introduction to multimedia presentation involving more than one type of AV equipment (Few workouts for such multimedia equipment operation should be carried out in the classroom.)

3. CD, DVD Player & Writer, combo System

Principles of operation of a CD writer & Combo System

Recordings techniques of CD writer & MP3 Systems.

STILL & MOTION PHOTOGRAPHY

VIDEOGRAPHY

SECOND YEAR

(Theory) Paper - II

Time: 2.30 hrs

Total - 68 periods

1. Elements of Still Camera & Digital Camera

Camera format (35mm, focusing system, image sharpness, lens opening exposure & its accessories).

Lens, Iris, shutter, film chamber, view finder, light meter.

2. Video Still Camera & Camcoder (CCD)

Lens system. lens control, sensitive of the camera, white balance, audio circuits, power supply, camera supports.

3. Video motion camers & recording principle

Recording format DV cam, Hi-8, Beta - cam.

Recording principles Helical scanning, Control track and Cue-pulses.

Recording audio on video tape.

Recording system standards PAL, NTSC, SECAM.

Digital Video Recording & DV Cam.

4. Projector working principle setting

Working principle of still & motion pictures, projection lamps, screen surface materials for screems methods of mounting the screens.

5. Principle setting and operation of a LCD Projector System

Setting of a LCD Projector System.

BASIC ELECTRICAL & ELECTRONICS

FIRST YEAR

(Practical) Paper - I

Time: 4 hrs

Total - 34 classes

1. Drawing of Electrical and Electronic symbols
2. Freehand sketching of electronic components and spare parts.
3. Study of hand tools

4. Identification & testing of components and devices
5. Sodering and De-soldering practice
6. Verification of Ohm's law & Kirchoff's Laws
7. Study of Series circuits & parallel circuits
8. Study of ElectricMotor
9. Study of Transistor Amplifier
10. Study of Voltage Stabilizers
11. Study of Oscillators
12. Study of Half Wave & Full Wave Rectifier (Center taps Bridge)
13. Study of SMPS
14. Practical of formotion of image with different types of lenses & mirrors (used in projectors)

MEASURING INSTRUMENT, RADIO AND TAPE RECORDERS
FIRST YEAR
(Practical) Paper - II

Time: 4 hrs

1. Study of voltmeter, ammeter & multi meter (Analog & Digital).
2. Measurement of Voltage & Current using Multimeter.
3. Study of CRO.
4. Measurement of frequency, phase and amplitude using CRO
5. Study of Redio Receiver (AM & FM)
6. Study of RF, IF & AF in a radio receiver.
7. Study of tape recorder & mechanical systems of tape recorder.
8. Study of recording in Tape recorder.
9. Study of Stereophonic recording and playback equipment.
10. Study of different types of Microphones & Loud Speakers.
11. Study of PA systems.
12. Practice in Fuse replacement and their ratings.

TV, VCR AND CCTV SYSTEMS

SECOND YEAR

(Practical) Paper - I

Time: 4 hrs

Marks - 100

Total - 68 classes

1. Study of a TV receiver.
2. Installation of TV, Booster, Antenna Cable.
3. Testing of TV (Sound & Picture)
4. Setting up and adjustment of TV
5. Minor fault detection and rectification of TV
6. Study of multimonitor cannections.
7. Study and operate a VCR
8. Installation of CCTV.
9. Study of CD Writer, DVD Writer & Combo Sets.
10. Interconnection techniques like preparation of cable and video patch cords.
10. Exercise on fault finding techniques in Adui visual equipment.

STILL & MOTION PHOTOGRAPHY

VIDEOGRAPHY

SECOND YEAR

(Practical) Paper - II

Time: 4 hrs

Marks - 100

Total - 68 classes

2nd Year Paper - II

1. Study of different types of Still & Digital Cameras
2. Practice of taking hand held shot
3. Practice of camera movement
4. Recording in Video motion cameras
5. Recording studio on Video tape
6. Recording in Digital Video Cameras

7. Study of opaque Projectors.
8. Study of motion picture projector and its parts
9. Settingup and operation of projector
10. Film threading and rewinding
11. Layout diagrams of film threading
12. Testing of a motion picture projector
13. Fabrication of extension boards and other auxiliaries
14. Setting of LCD Projector System
15. Project work.

SUGGESTED REFFERENCE AND READING MATERIALS

1. How to service tape recorders by C.A. Tuthill, D.B. Taraporevals & Co.
2. Record changers, How they work by Louis M. Dezettel D.B.Taraporevala.
3. How to select and use HI - FI and Stereo Equipment Volune - I by Murray P. Resental, D. B. Taraporevala.
4. Simplified electronics measurements. How to get more from low cost test equipments by john H. Fasal D. B. Taraporevala.
5. Preparation and use of Audio Visual aids by Hass & Packer Prentice - Hall of India (PVT) Ltd.
6. Application & Operation of Audio Visual equipment in Education by Fred Jhon Pula Jhon Wiley & Sons in New York, London.
7. An Introduction course for Electrical Technicians by R.J.Hartles Pitman Paperbacks.
8. Television Service manual by Audel D.B.Traprorevala.
9. Television Principle & Practice by Zarach & Mersis Mc Millan Press.
10. Basic Radio & Television by S. P. Sharma Tata Mc Graw Hill Publishing Co. Ltd.
11. T.V Trouble shooting Dictionary by Saundh, Nitma New Delhi.
12. Instruction materials Manual by Brown& Lewies Mc Graw, Hill.
13. The publications of Business promotion Bureau, Delhi - on practical topics like colour TV and VCR etc.
14. Closed circuit Television.
15. Practicals TV ServicingManuals-GT Publication.
16. Basic Electronics-GT Publications.
17. VCR, VCD-GT Publications.

BUILDING MATERIAL

FIRST YEAR

(Theory) - Paper - I

Time - 3 hours

Marks - 50

Total = 68 periods

Stone : Classification, composition, characteristics, uses, method of quarrying and dressing

Brick : Method of manufacture, classification, testing of bricks.

Cement : Classification, Chemical composition,
characteristics, grades, quality tests and uses
of concrete making materials (Coarse aggregate, Fine aggregate, water)r, Test of cement and concreate (W/C ratio Workability, Compressive and tensile strengh) Properties of fresh and hardended concrete, Durability of concreate, Admixtures in concrete.

Timber, Plywood : Characteristics and suitablity for different and allied purposes. Defects and decay, Seasoning and Products. preservation of Timber.

Tile ; Method of manufacture, composition, testing and its suitability for different use with reference to building (Clay, Terracotta, glazed Tiles, marble)

Steel : Characteristics, composition, grades & testing.

Paints, Varnishes Primers : Types of paint (All typesof paint i.e. cement paint, enamel paint distemper etc.) composition, characteristics, method of application adhesive.

Ref. Book :

1. Building material : - by S.C. Rangwalla
2. Building material : - by M.L. Gambhir.
3. Building material : - S.P. Bindra.
4. Building material : - Janardana Jha

BUILDING CONSTRUCTION

FIRST YEAR

(Theory) Paper - II

Time: 3 hours

Marks - 50

Total= 68 periods of 45 minutes each

Functional Planning	:	General principle of site selection, Site Plan, Building regulation and bye-laws, Orientation of Building, Basic requirement of a building and its component.
Foundation	:	Types of foundation, description of spread function, Raft foundation, pile Foundation, foundation for wall, masonary, concrete pillar, causes of failure of foundation and remedial measures. Brief idea on depth and breadth of foundation for different soils and loadings condition.
Brick Masonary	:	Terms used, General principle in brick masonary construction, types of bond and their application, Reinforced brick work.
Stone Masonary	:	Terms used, cutting and dressing of stone, types of stone masonary dry stone masonary.
Door and Windows	:	Types of door and windows, vertilation, sky light, fixture and fastening for door and windows.
Floor	:	Different types of floor, preparation, advantages and disadvantages.
Foof	:	Terms used, types of roof with special emphasis on RCC roof reinforcement details in roof, beam, lintel, columns etc.
Aeches, lintels and staircases	:	Terminology, Brief Description, Design dimensioms
Damp prevention	:	Causes of dampness and damp prevention, & Fire protection general principle of fire protection, Fire resisting materials and construtions.

Plastering pointing, white washing and colour washing painting, vaenishing and distempering.	:	Objectives, characteristics, tools, construction and defects.
Ventilation, Air conditioning Thermal insulation and sound insulation.	:	Noise, Insulation, Absorption, Transmission, Acceptable noise levels, Npise control and sound insulation, Necessity of ventilation and ventilation systems, Thermal insulating materials and construction.
Defects and Rehabilitation Measures	:	Inspection of buildings, Diagnosis, Defects in foundation, wall, floor, roof etc. in old building and its rectification. Anti-termite treatment.

Ref. Book :

1. Building Construction : by M.L. Gambhir
2. Building Construction : by B.C. Purmia
3. Building Construction : S.P.Arrora & S.P. Bindra
4. Building Construction : Susil Kumar
5. Building Construction : S.C. rangwalla
6. Building Construction : Janardana Jha
7. Building Construction : guruchanran Sing

ANALYSIS, DESIGN & DETAILING OF STRUCTURES

SECOND YEAR

(Theory) Paper - I

Time: 3 hours

Marks - 50

Total= 68 periods of 45 minutes each

Shear Force and Bending Moment Slope & Deflection	:	Definition, types of support, shear force and bending moment diagram for the structures. Inter-relations between Shear Force and Bending Moment. Brief idea on slope and deflection of simply supported, cantilever, continuous and fixed beams.
Properties	:	Properties of concrete, Basic idea on compressive of Concrete strength, tensile strength, shrinking, creeps, Grade of concrete, Reinforcing steel, its type and grade, basic concept on concrete design, limit state of safety and serviceability, single and double reinforced concrete, brief idea on design and details of beam, column, slab, stair case, column footing, mix design (brief idea) shrinkage and creep of concrete.
Reinforcement Concrete Structures		Reinforcement detailing for structure elements and Detailing of their joints. Codal provisions.

Ref. Books:

1. Anaysis of Structures, Vol- I : by Vazrani and Ratwani
2. Theory of Structures : - S. Ramamurthan
3. Basic Structure Analysis : - B.C. Pumia
4. Basic Structure Analysis : - C.S. Reddy
5. Concrete Structure : - Syal & Goel
6. Concrete Structure :- B.C. Punimia
7. Cobcrete Structure :- H.J. Saha

BUILDING SERVICES & INFRASTRUCTURAL ENGINEERING

SECOND YEAR

(Theory) Paper - II

Time - 3 hours

Marks - 50

Total=68 periods of 45 minutes each

Water Supply :	Introduction, Type of demand, quality of water, impuritiers in water, drinking water standard, desinfection of water (brife idea)
Sewage & its treatement :	Terminology, physical Chemical and Bacteriological Characteristics, Aerobic and Anaerobic Treatment with reference to house hold and small colony.
House Plumbing Services :	Planning, Terminology, water supply pipe and fitting, fixtures, and its house hold attributes, Wash basin Sink, Water closet, Flushing Cistern, Bath tubs etc. Sewerage construction, types laying andtesting, Gully traps, Inspection chambers and low cost sanitation, septic tank soak pit, leach pit etc. selection of domestic pump, its installation and maintenance,
Construction : Planning and Management	Terminology, brief idea on CPM, PERT, Bar chat
Estimation :	Introduction, types of estimation, principle of estimation, various item of work in building work, road short wall and long wall method, centre line method, rate analysis for different item, lead statement.
Roads :	Classification of road, carriage way, camber gradient, super elevation, specification of constuction of earth road, morum, water bound macadam road, bituminous & concrete road. (brief idea)
Surveying :	Principle of surveying, classification, chain surveying Leveling principle, reduced level, Bench mark, temporary adjustment of leveling, method ofbooking, error in leveling, contouring.
Reference :	1. Estimation by : - B.N.Dutta 2. Estimation by :- S.Chakravarty

3. Water Supply & sanitary Engineering
: -G.S. Biridie.
4. Water supply & sanitary Engineering
: - S.K. Garg.
5. Survey and leveling : - by R.A. Agar
6. Survey and leveling : - by B.C. punimia

PRACTICALS
First Year

Marks - 50

Total=34 clases of 3 periods each

Paper - I : Building Drawing

Marks - 50

Total=34 clases of 3 periods each

Paper - II : Field Study of RCC roof, Brick work, foundation, lintel, stair case etc.

PRACTICALS
Second Year

Marks - 100

Total=68 clases of 3 periods each

Paper - I : (i) Testing of Cement and Concrete
(ii) Testing of water samples

Marks - 100

Total=68 clases of 3 periods each

Paper - II : (i) Surveying and field work
(ii) Lay out plan of Building in field.

COMPUTER TECHNIQUE

First Year

(Theory) Paper - I

Total-68 periods

Marks - 50

UNIT - I **Mark(10)**

Computer Organization : Introduction to computer, Generation of modern computers, Characteristics of computers, Classification of computers, Structure and functions of digital computers.

Input / Output devices : Keyboard, Mouse, Touch screen, MICR, OCR, Light Pen, Joystick, VDU, Printer (Impact and non-impact), Dot matrix, Line printer, Daisy wheel printer, Laser printer, Inject and plotters.

Commputer memory : Primary memory, Storage hierachy, storage location and Address, Storage capacity, RAM, ROM, PROM, EPROM, EEROM, Cache memory, Buffer memory.

Secondary Storage : Sequential and direct access devices, Magnetic disk, Floppy disk, Winchester disk, Magnetic drum, Mass storage, Optical disk, Magnetic bubble memory.

UNIT - II **(Marks - 10)**

Introduction to computer language : Machine language, Assembly language and Highlevel language, 4GL translator, Compiler, Interpreter, Assenbler, Characteristics of good programming language.

Number System : Positional and non-positional number system, Types of numbers, Conversion (Binary, Octal, Decimal, Hexadecimal) Computer Codes (BCD, ASCII, EBCDIC), Sign magnitude representation, 1's and 2's complement representation, Computer Arithmetic (Binary addition, Subtraction, Multiplication and Division)

Algorithm and Flow Chart.

UNIT - III **(Marks - 10)**

Operating System : Definition, Evolution of Operating System, Batch processing system. On-line processing, Operating system controlled software, job Control Language, Spooling.

UNIT - IV

Simple Accounting : Introduction to Accountring, Definition of book keeping, Importance of accounting information, Role of Accounting, Objective and functioning of Accounting.

Accounting Concept Accounting a business Language, Transaction, Assets and liabilities, Goods, Debit and Credit, revenue and expenditure, fixed assets and current assets, Debtors and creditors, depreciation, closing stock, Example.

Types of accounts : Journal and ledge, Objectives of accounting, types of accounts, personal, real, normal accounts.

Books recommended :

1. Introduction to Computers :
   Alexis lean, Mathew Loan (Published by Lean Tech world)
2. Computer Fundamentals :
   P.K. Sinha (BPB Publication)
3. Computer Today :
   Suresh Kumar Bassandra (Golgotia Publication)
4. Computer Fundamentals :
   D.P. Nagpal (Wheeler Publication)
5. Introduction to Computers and Communication :
   (Tata Mc-Graw hill)
6. Fr, Sen. Sec, Computer Science (XI) and (XII) :
   By Frank Brother and Compary publication Ltd.,
   New Delhi

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OFFICE AUTOMATION
First Year
(Theory) Paper - II

Marks - 50

Total= 68 periods

2.1 MS - Windows: Working with Window

2.2 MS - WORD :

Starting MS-Word, Creating and operating, Saving a document, Editing Text.formatting documents : - Line spacing, paragraph Spacing, Setting tabs, Indenting text, Aligning text, Adding Proofing a document, mail merge.

2.3. MS - EXCEL :

Introducing starting MS - EXCEL, Opening of Worksheet, Saving a Worksheet, Spreadsheet operation : Entering Numbers, Text, Dates and Times Formulas Editing Worksheet : Deleting cells, Rows, Columns, Inserting cells, Rows and columns, Printing a Worksheet.

Formulas and Functions : Absolute and relative Reference of cell, Entering a formuls, Mixed Entering Function, Calculation using functions Different type of functions in EXCEL, charts: Creating Editing, Inserting, Deleting, Saving, Printing.

Macros : creation and Running simple macros, creating and **running menu macors.**

2.4. MS - POWERPOINT :

Starting power point, Operating and existing presentation, Creating, Closing and Saving a presentation. Existing Power

Point Using master - Slide, Title, Handout, Notes.

Editing text : Viewing a presentation in different view, Adding and deleting slides, Selecting text, Inserting and Deleting Text, Moving and copying text Changing text Case spell Checking.

Formatting Text : Changing text Attribute Styles, Changing Bullet, Characteristic aligning, Line setting, Paragraph Setting, Changing slide color scheme, More about Presentation, Drawing object like lines, Arcs, Rectangles, Ellips, Drawing Free from shapes, Using Auto shape, Rotating objects, Modifying colours and lines. Adding header and footer, inserting MS-Word tables or MS-EXCEL Worksheet, Printing presentation component.

2.5. DESKTOP PUBLISHING (DTP) :

CONCEPT OF DTP : Introduction to DTP - What is Desktop Publishing? Uses of DTP and print Documents, Uses of fonts, Frames, page layout, WYSIWYG, etc,. Advantages of DTP over Word processing.

Document Planning : - Page layout, Margin, Header and Footer, Fonts Styling.

2.6. DESKTOP PUBLISHING USING PAGEMAKER :

Page make and minimum configuration require for installation use of file, edit, page frame, font, graphic and option menus, creation of style sheet : - preparation of tables of contents, index, usages of width table, add or remove fonts, command for printing.

2.7. COREL DRAW :

Installation of Corel draw and minimum configuration, requirements, Surfing through opening interface for all tools and menus, working with texts, edit special effects, fonts and chosing artistic and paragraph text.

Using the Coralboard : - Working with objects, zooming, dragging and other features, special effects. Appetizers, oblect prospective, movements of objects, use of depth- width and contour and lens effects, cropping and bitmaps.

2.8. PRINCIPLES OF DOUBLE ENTRY : -

Characteristics of double entry, book keeping, double entry and single entry, advantages of double entry system, rules of debit and credit, examples-transaction and personal, real and normal accounts, journal and ledger, recording of transaction - journal, format, debit and credit, sides, journalizing a transaction, narration, types of transaction, - payments and receipts, payment in cash and cheque, buying goods / assets - payments to expenditure, sales and sales return examples, trial balance, trading and profit and loss account, blance sheet.

THEORY - 30 MARKS

VIVA- 10 MARKS

RECAL-10 MARKS

TOTAL-50 MARKS

FIRST YEAR

(Practical) Paper - I

Marks - 50

34 classes

1. Installation and fine-tunning of MS-DOS
2. Use of Internal and external commands of MS-DOS.
3. Instllation of Window.
4. Creates window, edit format and print document file, using MS-Word.
5. Designing spreedsheet and manipulation using different arithimetic function.
6. Role of Account sheet using MS-Excel.
7. Account concept using Tally.

. Define mail merge and describe the process of it.

FIRST YEAR

(practical) Paper - II

Marks - 50

34 classes

1. Installation of MS-Office.
2. Create a document files using all the options of MS-Word.
3. Speed sheet operation using reference of cell, Entering formula and function.
4. Charts creating editing, inserting, deleting, saving, printing, using the function of MS-Excel.
5. Operating and existing presentation of MS-Power Point.
6. Viewing a presentataion in different view using MS-Power Point.
7. Formula and uses of Desk Top Publishing.
8. Installation procedure of Corel-Draw and minimum configuration, requirements of Corel-Draw.
9. Use of the Corel board and all its functions.

DATABASE MANAGEMENT SYSTEM

Second Year

(Theory) Paper - I

Marks - 50

UNIT - I **(68 periods)** Marks (15)

Data processing concepts and file structure : Definition, fields, Records, and Files.

File Organization : Sequential file, Direct files, Index Sequential files.

File Utilities : Searching, Sorting, Merging, Coping, Printing, Maintenance, labeling, Scratching.

Data base System : Databse concepts, database management system, database structuring techniques, advantages and limitations of database system.

Data models : Hierarchical, Network, Relational data model, Object oriented database model, Entity-Relationship model and E-R diagram.

UNIT - II (Marks -15)

Network Technology : What is network, Types of network, private network, value added network, local Area Network (LAN), Wide Area Network (WAN), Metropolitan Area Network (MAN)

Network topology: bus, Star, Ring and Hybrid, Star-Bus, Star-ring,

Communication Technique : Analog and Digital Transmisson, Simplex, Duplex and Multiplexing, LAN Components. Active Hub, Passive Hub, LAN cable, Bridgers, Router.

UNIT - III (Marks- 20)

Network Environment : Network Operating System, Unix, Netware, Windows NT, Introduction to Clint/Sever Architecture-Introduction to windows NT, Installation and work group of NT Sever File management, booting sequence, Installation of work station, Securities, Connectively to diverse plaform, Remote Access Sevice, Introduction to TCP/IP addressing.

Network Application : Messaging-Interent, Email, Facsimile, EDI Talk, write Service FTP, Gopher, Archive, Telnet, Web Application-Web Browser, Mosair, Netscape, Navigatom, Microsoft Interent Explorer, Introduction to HTML, Editor, Creation of HOME page Internet.

Books recommended :

1. Computer Fundamentals
   P.K. Sinha, and Preeti Sinha (BPB Publication)
2. Commercial Application Development using ORACLE Development 2000 - IVAN bayross. (BPB Publiction)
3. Introduction to Computers and Communication.
   (Tata Mc-Graw hill)
4. Computer Science of Class XII by S Arora.
5. Introduction to Computers and communication by Ravichandran (Tata Mc-Graw hill)
6. ABC of Interent By Crumlish BJP publication.
7. Fundamentals of Computers, By P.K. Sinha and Preeti Sinha

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C - PROGRAMMING AND DATA STRUCTURE

Second Year

(Theory) Paper - II

Total=68 periods

Marks - 50

UNIT - I Marks (15)

FUNDAMENTAL OF C PROGRAMMING : - History of c, Structure a C program, Data type : int, float, char, double, void, constant and variables declaration, integer, real, float, character. logical variables, string variables constant.

Operators and Expressions : - Arithmetic Operational, logical Operators, Expressions, Bitwise Operators, & operators, * operators, type casting, Type conversion.

Decision Making and Looping : - If -Then-Else ladder If-Else, for loop, while.

UNIT - II (Marks - 15)

Arrays and Function : - Arrays declaration, one and two-dimensional arrays, Function :- Fundamentals, General form, Function arguments, and return value.

Basic I/O : Formatted input / output, Unformatted input / output, program design examples, Summation of a set of numbers, Generation of Fibonacci sequence, generation of positive prime numbers, finding the smallest element, sorting by insertion.

Structure Programming : - Control structures, Do - While, Switch statement, break and continue, exit () function, go and label.

UNIT - III (Marks - 20)

Advance Features in Function : - Type of modifiers and storage class specifier of a data type, scope rules, Local and Global variables, scope rules for function, Parameter Passing :- call by value, call by reference, Calling function with Arrays argc and argv, recursion, Basic concept, Design Examples, Tower of Hanoi, Recursive quick sort.

Dynamic Data Structures in C :- pointer & operator, pointer expression, pointer assignments, pointer arithmetic, Pointer comparison, the dynamic allocation function, malloc, calloc, pointer vs, arrays, Arrays of pointer, Pointer to functions, Function returning pointers, Function with variable number of arguments.

Structure : - Basic of structures, Declaring a structure, Referencing structure elements, Arrays of structure passing, Structure to function, structure pointer, Arrays and sturctures within structure, Uses.

Union : - Declaraction, Uses, Enumerated data types, link list inseration, decletion and search.

Books Recommended :-

1. Programming with C, By B. Gotfridgre
   (Tata Mc - Graw hill)
2. Let us C, By. y. kanithkar
   (BPB Publication)
3. Programming with C by K.R. Venugopal and S.R. Prasad.
   (Tata Mc - Graw hill)

THEORY - 70 MARKS (Two Questine)
VIVA- 20 MARKS
RECAL-10 MARKS
TOTAL-100 MARKS

Second Year
(practical) Paper - I

Marks - 100

Total = 68 classes

1. Create a Database and adding records to it
2. Programming using arrays and multiple files.
3. Expose to Network Connective hard ware and device for the following.
   (i) UTP and Co-axial Cable
   (ii) Configuration of UTP HUB.
   (iii) Connectors
   (iv) Router
4. Developing Network connectively using different topology.
5. Internet working different nodes using TCP/IP.
6. Getting connectively and configuration of Internet hardware Between Server0-Server and Server-Clint.
7. Create a HTMI. Page.
8. Create a Home page using HTMI.

Second Year

(practical) Paper - II

Marks - 100

68 classes

1. Programs using problem mainly computation to illustrate expression and operator.
2. Problem relating to sequence, selection and iteration,
3. Problem related Looping.
4. Problem related to Array and Function.
5. Problem related in Structure.
6. Problem involving manupulation of Array of Structure.
7. Problem related to Pointer.
8. Modifier and storage class specifies for a data types.
9. Problem for dynamic storage allocation such as link list, Stack.

COURSES OF STUDIES

IN

MAINTENANCE AND REPAIR OF ELECTRICAL DOMESTIC APPLIANCES

1. Introduction :

Vocational Course in maintenance and repair of Electrical Domestic Appliances has been designed for the two-year course of Higher Secondary (+2 stage) of school education. The course is of immense utility both to job-employment and self employement. The theoretical, practical and on-the job aspects of the course has been well taken care of. The theory and practicals have been given 33% and 67% weightage respectively.

2. Objectives :

1. To create awareness about types and make of domestic appliances.
2. To acquire knowledge about tools. equipment and machines required for assembling, testing, repairing and maintenance of domestic appliances.
3. To acquire skill in assembly, repair, test and maintenence of domestic appliances.
4. To acquire skills in Sales and marketing of domestic appliances.
5. To acquire skills in entrepreneurship in the vocation.

3. Course Structure :

The entire course comprise four clusters of subjects :

1. Languages - Mother Tongue and English,
2. Basic Foundation Course,
3. General Foundation Course and
4. Vocational Course theory and Practicals.

COURSES OF STUDIES

IN

MAINTENANCE AND REPAIR OF ELECTRICAL DOMESTIC APPLIANCES

ELEMENTS OF ELECTRICAL TECHNOLOGY

FIRST YEAR

(Theory) Paper - I

(Marks - 50)

68 Periods

1. **Current Electricity :** Electricity as a source of energy. Definition of Resistance, Voltage, Current, Power, Energy and their units, Relation between Electrical, Mechanical & Thermal units, Factor effecting resistance of a conductor, temperature co-efficient of resistance Difference between A.C and D.C voltage and current.
2. **D.C circuit :** Ohm's law, Series and parallel resistance circuit and their equivalent resistance, Kirchoff's laws and their applications.
3. **Electric cell :** Primary cell, wet cell, Dry cell,Series and parallel connections of cells, Secondary cells, Lead acid cells, Discharging and re-charging of cells, common charging methods, preparation of electrolytes, care and maintenance of secondary cells.
4. **Heating and lighting effects of current :** Joule's laws of electric heating and its domestic applications, heating efficiency.
5. **Capacitors :** Capacitors and its capacity. Types of capacitors and their use in circuits. Series and parallel connection of capacitors, Energy stored in a capacitor.
6. **Electromagnetic Effects :** Permanent magnet and Electromagnets, their construction and use, Polarities of an electromagnet and rules for finding them. Faraday's laws of Electromagnetic induction. Dynamically induces e.m.f, its mangnitude and direction. Static induction, Self-induced e.m.f, its magnitudes and direction, inductance and its units. Mutually induced e.m.f, its magnitude

and direction. Energy stored in an industance. Force acting on a current carrying conductor in magnetic field its magnitude and direction. Torque produced on a current carrying coil in a magnetic field. Principles and construction of dynamo.

7. **A.C. Circuits :** Generation of A.C. voltage, its generation and wave hape, cycle, frequency, peak, volue (maximum value), Average value, instantaneous value, r.m.s. value, form factor, crest factor, phase difference, power & power factor (Leading and Lagging). A.C Circuit with **(i) Resistance and inductance (ii) Resistance and capacitance (iii) Resistance, inductance and capacitance in series,** Q-factor of R-L-C series circuit.

8. **Measuring Instruments :** Construction and working principle of moving iron and moving coil voltmeter. Oha meter. Megger and induction type Energy meter-their circuit connection and application for measurement of electrical quantities.

9. **Electrical wiring :** Types of wiring - cleat wiring, casing and capping, C.T.S / T.R.S wiring, conduct wiring and concealed wiring - their procedure of installation. factor of selection of a particular wiring system. Importance of switch, fuse and earthing or wiring system. Types of faults, their causes and remedies. Methods of finding numbers of circuits and circuit distribution, board system. Loop in system of wiring connections. IE rules related to wiring.

10. **Types of Earthing :** Plate Earthing and pipe earthing, their procedure and application.

11. **Diodes and transistors :** Types of diodes and transistors, Working principle and charactiristics of diodes and Transistors. Diodes as a rectifier and transistor as amplifier-use of zenor Diodes for voltage stabilization.

COURSES OF STUDIES

IN

MAINTENANCE AND REPAIR OF ELECTRICAL DOMESTIC APPLIANCES

ELEMENTS OF ELECTRICAL TECHNOLOGY

ELEMENTS OF ELECTRICAL DEVICES

FIRST YEAR

(Theory) Paper - II

Marks - 50

68 Periods

1. **D.C. Moters :** Types of moter-Series, Shunt, Compound and Universal. Construction, Working priniciples, characteristics and applications of different types of motors (fractional horse power). Straters and starting of D.C. Motors, Speed control of D.C motors and testing and repairs.

2. **Transformer :** Types of Transformer-Step-up and step-down transformer, voltage and current transformer, auto-transformer, construction, working principle and application of different types of transformers.
3. **Single Phase A.C. Moter :** Types of A.C. Motors-Induction Motor(Split phase and repulsion start), capacitor motor, shaded pole motor, Universal motors, Constructions, Working principles, special characteristics, winding details and application of different types of fraction horse power motor. Speed reversal and speed control of single phase A.C. Motor. Installation of A.C. Motors and Testing common faults, their causes, testing and repairs. Rewinding of fractional H.P. motors.
4. **Electric Room Heater :** Construction and working principle of Reflector type Room Heater, common defects, testing and repair.
5. **Electric Iron :** Types of Electric iron-Ordinary type and Automatic / Thermostat Control Type. Construction and working principle of electric irons, common defects.
6. **Electric Stove :**Types of electric stoves-Coiled type, covered type, Hot plate, Gill / oven. construction and working principles of electric Stoves. Common defects, testing & repair.
7. **Electric toasters :** Types of toaster - ordinary & automatic. Construction and working principles of electric toaster, common defects, Testing & Repairing.
8. **Immersion Heater Geyser :** Construction, working principles and use of immersion heater and Geyser, Common faults, their causes, testing & repair. Testing and installation of Geyser, Precautions in using immersion heater and Geyser.
9. **Table Lamp amd Tube Light :** Construction working and use of Table Lamp, Night Lamp, Tube Light; Common faults, their causes, testing and repair.
10. **Electric Bell, Buzzer and Door Chimes :** Construction, working principles and use of Electric Bell, Buzzer and Door Chimes. Common faults, their causes, testing and repair.
11. **Electrical Room Heater :** Construction and working principles of Blower type Room Heater, common defects, their causes, testing and repair.

COURSES OF STUDIES

IN

MAINTENANCE AND REPAIR OF ELECTRICAL DOMESTIC APPLIANCES

ELEMENTS OF ELECTRICAL TECHNOLOGY

DOMESTIC APPLICATION AND MATERIALS

SECOND YEAR

(Theory) Paper - I

Marks - 50

68 Periods

1. **Electrical Fan :** Types of Fans - Ceiling fan, Pedestal fan, Bracket fan, Exhaust fan, construction, working principle, special characteristic and applications of electric fans. Common faults, their causes testing and repair, Installation of Bracket fan and Exhaust fan.
2. **ElectricMixer Grinder :** Construction, working principles, special characteristic and applications of Electrical Mixer Grinder, Common faults, their causes, testing & repairs. Servicing maintanance and overhauling of Electric Mixer Grinder.
3. **Electric Washing Machine :** Constructions, Working principles, special features and applications of Washing Machine. Common faults, their causes, testing & repairs. Services and overhauling of washingmachine.
4. **Hair Dryer / Curler :** Constructions and working principles of Hair Dryer / culer. Common faults, their causes, testing & repair.
5. **Room Cooler :** Construction, and working Details of Room Cooler. Common faults, their causes, testing & repair installation of Room Cooler.
6. **Emergency Light and Stabilizer :** Construction, working Principles of Emergency Light and Stabilizer. Common faults, their causes, testing & repairs.
7. **Conducting Materials :** Copper and Aluminium as low resistivity materials, their electrical characteristics and applications. Eureka Selenium and Carbon as high resistivity material, their electrical characteristics and applications. Electric resistance materials.
8. **Insulating Materials :** Distinction between Conductor, Insulator and semi Conductor, Insulation resistance, dielectric strength break down voltage, mechanical and physical properties and classification of insulating materials. Paper, Plastic coated paper, OVC, Porcelain, Bitumen, Mica, Bakelite, Ebonite, Marble, Glass, Asbestos, Fibre glass - their electrical characteristics and applications, Insulating Tapes, Sleeves, Insulating and impregnations with varnishes and paints their uses and applications.

9. **Megnetic Materials :** Classification of material as Ferro-magnetic materials, Soft and Hard magnetic materila. Losses in magnetic materials and procedure to reduce losses. Mild steel, Silicon steel Mumetal, Premalloy,Alnico as magnetic materials, their properties and uses.
10. **Structural Materials :** Iron, Steel, Brass, un Metal and Aluminium as structural material, their properties and applications.
11. **Fuse and Soldering Materials :** Silver, Copper, Lead, Tin and alloys as fuse material, their properties ans application. Soldering and Brazing materials and tools. Procedure of Soldering and Brazing and precautionary measures.

COURSES OF STUDIES

IN

MAINTENANCE AND REPAIR OF ELECTRICAL DOMESTIC APPLIANCES

WORKSHOP PRACTICE & SAFETY

SECOND YEAR

(Theory) Paper - II

Marks - 50

68 Periods

1. **Safety Precaution and Shock Treatment :** Familiarizing the student with shop discipline. Layout of shops. Safety Precautions. Use 10f fire fighting equipment. First Aid practice. Causes of electric fire & shock. Procedure for removal of person from contact of live wire. Treatment for electric shock and burns.
2. **Common Tools :** Familiarizing the students with common tools. safe and proper use of tools, their adjustments and applications.
3. **Corrosion Protective Paints :** Components of Paints and methods of preparation. Application of paint for Corrosion protection and orecaution in Painting.
4. **Transmission of Power :** Belt drive, shaft drive, Gear drive. Chain drive, Friction drive and their application in domestic appliances.
5. Electrical symbols and blue print reading.
6. Construction and application of bimetallic relays and thermocouple, for control of temperature and current.
7. **Repair Shop :** Tools, Machines, Equipments and Instruments required for Repair- shop, their working and use. Planning layout and setting of s Repair - shop. Rules and methods of repair, servicing and overhauling domestic appliances. Safety precautionary. Measures in Repair shop. Up-keeping of repairing shop.

8. **Winding Shop :** Tools, Machines, Equipments and Instruments required for Winding shop- their working and use. Planning layout and setting of a winding shop. Rules and methods of winding of armature, stator, rotor and field coils. Safety precautionary. measures in winding shop.
9. **Estimating :** Elements of estimation, Quantity and specifications of required materials. Knowledge of Waste and extra materials requirement, proforma for estimation.
10. **Project Preparation :** Need of project Preparation, information required for project preparation and their collection. Requirement of land, building, machines, materials, man. power, physical facilities and their excepted cost. Estimation of recurring, non-recurring and unforeseen expenditure. Total cost of project with details. Project preparation for Assemble shop. Testing Laboratory Repair-shop and Winding shop.

COURSES OF STUDIES

IN

MAINTENANCE AND REPAIR OF ELECTRICAL DOMESTIC APPLIANCES

ELEMENTS OF ELECTRICAL TECHNOLOGY

FIRST YEAR

(PracticaL) Paper - I

Marks - 50

34 classes

1. Study of series resistive circuit.
2. Study of parallel resistive circuit.
3. Study of series and parallel connection of cells.
4. Preparation of Electrolyte for Lead-acid battery and its charging.
5. To find heat efficiency of an electric kettle.
6. Varification of magnetic field of a solenoid with (i) Iron core and (ii) Air core.
7. Verification of Faraday's Laws of Electromagentic induction.
8. Verification of Torque development in a current carrying coil placed in a magnetic field.
9. Measurement of resistance by ammeter and voltmeter methods and ohmmeter.
10. Dismantling and reassembly of dynamo.
11. Connecting Lamps in series, parallel and series parallel circuits.
12. Controlling a lamps from two places.
13. Drawing schematic diagram to give supply to consumers.

14. E.I. Practice on p.v.c. casing capping and CTS / TRS wiring
15. E.I. Practice on conduct wiring.
16. E.I. Practice on concealed wiring.
17. Measurement of Insulation resistance of wiring installation by megger.
18. Polarity test of wiring installation.
19. Testing of wiring installation.
20. Installation of pipe earthing for wiring installation.
21. Installation of Plate earthing for wiring installation.
22. Testing and finding faults of wiring installation and rectification.

COURSES OF STUDIES

IN

MAINTENANCE AND REPAIR OF ELECTRICAL DOMESTIC APPLIANCES

ELEMENTS OF ELECTRICAL TECHNOLOGY

ELEMENTS OF ELECTRICAL DEVICES

FIRST YEAR

(Practical) Paper - II

Marks - 50

34 Classes

1. Study of S- L series circuit and measurement of power and power factor.
2. Study of R- C series circuit and measurement of power and power factor.
3. Study of R - L - C series circuit and measurement of power and power factor.
4. Study of R - L - C series circuit, for calculation of inductive reactance capacitive reactance impedance and Q-factor.
5. To test and repair of defective cycle dynamo.
6. Dismanting, study and reassembling of a D.C motor.
7. Measurement of resistance of series and shunt field and armature and identification of terminals by Multimeter.
8. Measurement of insulation resistance of armature and field.
9. Testing, fault finding and repair of D.C motor.
10. Overhauling of D.C. motor.

11. Dismantling, study and reassembling of a D.C. Motor Starter.
12. To study D.C. series motor, its runing, speed control and reversing rotation and measurement of current, voltage and speed.
13. To study D.C shunt motor its running, speed control and reversing direction of rotation, measurement by voltage current and speed.
14. To study D.C compound motor, its running, speed control and reversing rotation and measurement of current, voltage and speed.
15. Armature Winding.
16. Winding field coil.
17. Identification of semi conductor devices.
18. Characteristics of Diode.
19. Study of half-wave rectifier circuit with or without filter.
20. Study of full wave rectifire circuit with centre tap transformer with or without filter.
21. Study of bridge rectifier circuit with and without filter.
22. Study of transistor amplifier circuits. (i) common base, (ii) common emitter & (iii) Common Collector.

COURSES OF STUDIES

IN

MAINTENANCE AND REPAIR OF ELECTRICAL DOMESTIC APPLIANCES

ELEMENTS OF ELECTRICAL DEVICES

SECOND YEAR

(Practical) Paper - I

Marks - 100

68 Classes

1. Study & Rewinding of (i) Voltage transfomer, (ii) Current transformer & (iii) Auto-transformer.
2. Dismantling, study and reassembling of an A.C.Motor.
3. Overhauling of an A.C.Motor.
4. Study of an A.C. motor starter.
5. Testing, fault finding and repair of an A.C. moter.
6. Connecting, strating, running and reversing of squirrel cage induction motor.

7. Connecting, strating, running and reversing of of a capacitor motor.
8. Connecting, strating, and running of a shaded pole motor.
9. Connecting, strating, running and reversing of an A.C. Universal motor.
10. Dismantling and reassemble of reflector type Room heater.
11. Testing and repair of Reflector type Room Heater.
12. Dismantling and reassembling of Electric Iron. (i) Ordinary (ii) Automatic / Themostat control type.
13. Testing and repair of Electric Iron (i) Ordinary type and (ii) Automatic / Themostat control type.
14. Dismantling and reassemble of Electric Stove (i) Coiled type (ii) Covered type (iii) Hot plate, (iv) Grill.
15. Testing and repair of Electric Stove (i) Coiled type (ii) Cored type (iii) Hot plate, (iv) Grill.
16. Testing, repair and reassembling of Electric Toaster (i) Ordinary and (ii) Automatic.
17. Testing, Dismantling and reassembling the Geyser.
18. Testing, Dismantling and reassembling of Electric kettle and Coffee Percolator.
19. Dismantling and reassembling, testing and repair of Electric gas Lighter.
20. Connection of Fluorescent Tube Light (FTL).
21. Testing and repair of (i) Table Lamp, (ii) nightLamp, (iii) Tube light..
22. Testing and repair of (i) Electric bell, (ii) Buzzer and (iii) Dootr Chimes.
23. Testing fault finding, repair and Overhauling Blower type Room heater.
24. Testing, fault finding repair and Overhauling of Electric Fan Mixer Grinder & Washing machine.

COURSES OF STUDIES

IN

MAINTENANCE AND REPAIR OF ELECTRICAL DOMESTIC APPLIANCES

MATERIALS AND WORKSHOP PRACTICE

SECOND YEAR

(Practical) Paper - II

Marks - 100

68 Classes

1. Technique of removing persons in contact with live wire suffering from electric shock.
2. Artificial respiration and shock treatment.
3. Identification of common Tools.
4. To form two identical solenoids using insulated copper and Aluminium wire of same gauge and same number of turns and compare their resistances with field strength.
5. Identification of different insulating materials.
6. Practice for taping of winding, and insulating (i) Slots and (ii) Cores.
7. Varnishing of Insulating Coil winding.
8. Identification of magnetic and non-magnetic materials.
9. Testing fuse wires of different diameter.
10. Finding relationship between wire diameter and fusing current for instantaneous fusing.
11. Soldering practice.
12. Dismantling and reassmbling pulley on motor shaft. Practice on adjustment of belt tension.
13. Familarization with gears and its movements.
14. Drawing Layout of (i) Assembly Shop, (ii) TestingLaboratory, (iii) Repair Shop & (iv) Winding Shop.
15. Drawing (i) Lap-winding & (ii) Wave Winding for armature winding.
16. Drawing Stator coil winding.
17. Practice for Armature winding of D.C. motor used in appliances.
18. Coil winding of D.C. motors used in appliances.
19. Winding of A.C. motors used in appliances (Fan). Prepare estimate for repair, service and overhauling of domestic appliances, its costingand billing.

COURSES OF STUDIES

IN

MAINTENANCE AND REPAIR OF ELECTRICAL DOMESTIC APPLIANCES

Suggested Reading Materials

1. Study of Electrical Appliances and Devices :K.B. Bhatia.
2. Small Appliances Servicing : P. T. Brock well.
3. How to repair small Appliance : jack Darr.
4. Electrical wiring, Estmating and Costing : J.B. Gupta.
5. Electrical Appliances : I.M. Anwani.
6. Electrical Gadgets and their Repairs : S. R. Rao.
7. Electrical Wiring, Estmating and Costing : S.L. Uppal.
8. Fundamentals of Maintenance of Electrical Equipments : K.B. Bhatia.
9. Electrical Motor Winding & Repair : Anwani.
10. Electrical Gadgets : H. Partab.
11. Maintenance of Domestic Appliances (Hindi) : R.K. Lat.
12. Home Appliances : Edwin.

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REPAIR AND MAINTENENANCE OF POWER DEIVEN FARM MACHINERY (PDFM)

Total no of Theory clases in one subject in a week = 3 (1 hour duration)

Total no of practical clsses in one subject in a week= 1(3 hour duration)

1st year

Theory - I : 50 marks Practical - I :50 marks

Theory - II : 50 marks Practical - II : 50 marks

2nd year

Theory - I : 50 marks Practical - I :100 marks

Theory - II : 50 marks Practical - II : 100 marks

1st year

Theory - I : Crop production Machinery

Theory - II : Post Harvest Machinery

Practical

Paper - I : Relating to paper - I

Paper - II : Relating to paper - II

2nd year

Theory - I : Tractor, its engine and other systems

Theory - II : Power tiller, Electric motor and Renewable Energy Gadgets.

Practical

Paper - I : Relating to paper - I

Paper - II : Relating to paper - II

CROP PRODUCTION MACHINERY
FIRST YEAR
THEORY-I

Total No of Theory Periods = 34

Marks-50

A Tillage Machinery

Definition and objective of tillage, Classification of tillage- Primary and secondary tillage. Mould Board Plough: Classification of MB ploughs – One way, two way, parts: share, mould board, land side, frog etc., materials of construction, accessories and their functions, jointer, coulter, furrow wheel, adjustment of plough- horizontal and vertical suction, setting of coulter and jointer. Disc plough, types, parts and functions – disc, frame, bearing, scraper, adjustment of disc and tilt angles.Harrows: types, parts, function, materials of construction, adjustment of gang angles leveling of harrow, cultivators, clod crusher, levelers, bund former- parts and their functions.

B. Sowing Machinery

Methods of sowing, Seed drills: plain drills and seed cum fertilizer drills, various parts, function and their materials of construction. Types of seed metering devices, calibration of seed drill.Planters : Types, parts, functions and materials of construction. Types of metering devices, setting up planters for row and plant spacing, Transplanters- its types, working principles of transplanter, nursery raising technique.

C. Plant Protection Equipment

Use and application of agricultural chemicals. Types of sprayers and their uses., construction and function, types of dusters and their uses, construction and function, Safety precaution in handling of chemicals and operational techniques. Proper off-season storages.

D. Harvesting Machinery:

Reaper windrower. Vertical conveyor reaper, types of tractor and power tiller operated reaper windrower. Constructional details of reaper, functions of parts and materials of construction and adjustments. Safety precautions. Common faults and corrective measures.

E Combine Harvester :

Constructional details and functions of different sub-assemblies of tractor driven combine and self-propelled combine harvestor. Adjustments in reel, cutter bar, conveyor, threshing units, separating and cleaning unit, grain augers, bagging units, power transmission mechanism, hydraulic and electrical system. Care, maintenance and safety precautions. Common faults and remedies.

POST HARVEST MACHINERY
FIRST YEAR
THEORY – II

Total No. of theory periods = 34 **Marks -50**

A. **Threshing Machinery**

Types of power threshers, working principles and constructional details. Different types of threshing cylinders and their adjustments. Types of cleaning and grain handling systems and their adjustments. Dismantling of power thresher, identification of different components, materials of construction, checking of damaged/worn out parts, their reconditioning, repair and/or replacement and assembly. Installation, adjustment and commissioning of power thresher, safety precaution. Care, maintenance and safety precautions. Common faults and corrective measures.

B. Sugarcane Crusher, Chaff Cutter, Maize Sheller, Groundnut Decorticator

Sugarcane crusher: Introduction to different types of cane crushers like smooth roll crusher and serrated or toothed roll crusher. Main parts of cane crushers like rollers, gear assembly, feeding assembly, feeding mechanism etc., and their functions and operation of crushers. Installation of sugarcane crusher. Adjustment/alignment of gap between rollers, spring load and rpm for optimum use of crushers. Common faults and corrective measures. Safety and precaution in use of cane crushers.*Chaff cutters*: Introduction to different types of commonly used hand and power operated chaff cutters. Main parts of chaff cutter like feeding rollers, fly wheel, cutting blades and feeding mechanism and their functions. Installation of chaff cutters. Adjustment/alignment of feeding rollers, cutting gap and other systems for their efficient uses. Common faults and corrective measures. Safety and precaution in use of chaff cutters.*Maize shellers and Groundnut decorticators* : Introduction to commonly used manual and power operated maize shellers and groundnut decorticators. Main parts of maize shellers and groundnut decorticators and their function and operation. Adjustment, alignment of various components of maize shellers and groundnut decorticators for their efficient uses. Common faults and their rectification. Safety and precaution in use of maize and groundnut decorticator.

C. Cleaning and Grading Machinery:

Definition of cleaning, grading, package, foreign matter, size, shape, specific gravity, terminal velocity, coefficient of friction and angle of repose.Types of commonly used cleaners and graders like air screen cleaners, rotary cleaners, vibratory screen cleaners, disc separator, inclined cylinder separator, specific gravity separator, magnetic separator, cyclone separator, their uses and suitability to different farm produce. Components of cleaners and graders like hopper, sieves, blower, escalating mechanism etc., their functions materials of construction and functional requirements.Installation of cleaning and grading machinery. Adjustment and alignment of feed rate, sieve selection (mesh number

of screen), slope of sieves, airflow rate, frequency and amplitude of oscillations for optimum efficiency. Common faults and corrective measures. Safety and precaution in use of cleaners and graders.

D. Drying Equipment/Machinery

Definition of drying and related terms like moisture content, bound moisture, unbound moisture, free moisture, thin layer drying, dry bulb temperature, wet bulb temperature, relative humidity etc. Advantages of drying farm produce and safe moisture contents for storage. Drying methods- convection drying, conduction drying, vacuum drying and their uses, commonly used dryers like flat bed type batch dryer. Lousiana State University (LSU) dryer, rotary dryer, tray dryer, spray dryer, their uses and suitability to different farm produce.Part of drive like drying chamber, air distribution system, direct or indirect heating system, their functions, materials of construction and functional requirements, installation of drives. Adjustment of drying, air temperature, air flow rate, grain flow rate etc. For efficient use of dryers. Common faults and their rectification. Safety and precaution in use dryers.

E. Milling Machinery

Definition of milling and terms like cleaning, mixing, peeling, hulling, polishing dehusking, sorting , size reduction, size average partial size screen analysis. Types used and commonly used flour mills, spice mills like burr/plate/attrition mill, hammer mill, ball mill, dal mills like abrasive roller mill and roller mill and rice mills/hullers like Edenberg huller, rubber roll sheller, under runner disc huller, centrifugal dehusker and vertical cone whitener. Introduction to flour mills like mills/hullers like traditional rice huller and modern rice mills. Installation of milling machinery. Adjustment/alignment of spacing between plates, rpm, screen size, gap between rubber rolls and spacing between emery rollers/cone and screen etc. for efficient uses of mills. Common-faults and corrective measure in the mills. Safety and precaution in use of milling machinery. Components of flour mills, dal mills and rice mills/ hullers, their function, materials of construction and functional requirements.

CROP PRODUCTION MACHINERY
FIRST YEAR
PRACTICAL -I

Total No. of practical classes = 34 classes **Marks-50**

A Tillage and Interculture

Mould Board Plough: Familiarization with different agricultural machinery. Identification of different part of mould board plough and materials of construction, dismantling of mould board plough, reconditioning/replacement of damaged/worn-out parts, assembling of different parts of mould board plough, adjustments of horizontal and vertical suctions, adjustments of depth and width of cut. Setting of coulter, jointer and furrow wheel for better performance of the plough.

Disc Plough and Harrows: Identification of different parts of disc plough, materials of construction of various parts, dismantling of disc plough, reconditioning/replacement of damaged/worn out parts, assembling of different part of disc plough, adjustments of disc and tilt angles, adjustments of depth, width and furrow wheel. Identification of different parts of disc harrows and cultivators, dismantling reconditioning/replacement of damaged/worn out parts, assembling and various adjustment.

Rotavator and Cultivator: Identification of different parts of rotavators and rotary tillers, materials of construction of various parts, dismantling of rotavators/rotary tillers, reconditioning/replacement of damaged/ worn out parts, assembling and lubrication, Adjustments for better performance. Identification of different parts of a cultivator, replacement of cultivator tynes.

B Sowing Machinery

Identification of different parts of seed cum fertilizer drill, materials of construction of various parts, adjustment of furrow opener and reconditioning/replacement of damaged/ worn out parts of the seed-cum-fertilizer drill, dismantling of seed and fertilizer metering mechanisms and study of parts. Calibration of seed-cum-fertilizer drill in shop, servicing and maintenance after its use. Identification of different parts of planters-materials of construction, adjustment of furrow opener and reconditioning/ replacement of damage/worn out parts, familiarization with different types of furrow openers, selection of proper seed plates, drive gear and their fitting, adjustment of land markers, servicing and maintenance after use. Familiarization with different parts of transplanter. Study of seedling tray and finger movement mechanism, adjustment for number of seedlings and depth of planting.

C Plant Protection Equipment

Identification of different parts of sprayer, dismantling of sprayer, reconditioning/replacement of worn out/damaged parts, assembling of sprayer and resetting of nozzle and cut-off device, operation and calibration of sprayer for specific applications, identification of different parts of duster, materials of construction, reconditioning/replacement of worn out/damaged parts, setting and operation of duster.

D Harvesting Machinery and Combine Harvester

Identification of different parts and components and materials of construction of reaper windrower, carrying out adjustments of cutter bar, registration and alignment, overload protection safety clutch, operation, care and maintenance. Identification of different parts and assemblies of combine harvester. Dismantling, checking, reconditioning, replacement of different reaper and combine harvester components and assembly. Trouble shootings and their remedies.

POST HARVEST MACHINERY
IST YEAR
PRACTICAL – II

Total No. of Practical Classes = 34 classes **Marks- 50**

A Threshing Machinery

Identification of different components of power operated threshers and axial flow threshers, adjustments of different components for better threshing and cleaning efficiency, routine maintenance of threshers.

B Sugarcane Crusher, Chaff Cutter, Maize Sheller, Groundnut Decorticator

Familiarization and identification of different parts of components of commonly used sugarcane crushers, function of different parts and their adjustment for efficient operation

Familiarization and identification of different components of commonly used chaff cutters function of different parts and their adjustment for efficient use.

Familiarization and identification of different components of commonly used maize shellers. Function of different parts and their adjustment for efficient use.

Familiarization and identification of different components of power operated groundnut decorticator and their adjustments for better performance.

C Cleaning and Grading Machinery

Identification of different parts and components of commonly used cleaners and graders, their adjustments, operation and functions.

D Drying Equipment/Machinery

Identification of different parts, components of drying equipments/ machinery, their adjustment, operation and functions.

E Milling Machinery

Familiarization and identification of different parts and components of commonly used flour mills, spice mills, dal mills and rice mills/hullers, function of different parts and their adjustment for efficient use and operation.

Familiarization and identification of different parts of commonly used oil expellers, function of different parts and their adjustment of maximum oil recovery.

TRACTORS AND THEIR SYSTEMS
SECOND YEAR
THEORY –I

Total No. of theory periods = 34 **Marks-50**

A. **Engine**

Constructional features of I.C. engine and familiarization with principal parts. Principles of operation and salient features of four stroke engine. Multi-cylinders engine, firing order and valve arrangements. Fuel system, major components of fuel system, systems of fuel injection, different parts of injection, pumps and injectors and their functions, governing system, function of a governor, principles of operation and classification. Lubrication system: definition of friction, functions of lubricating systems and their main parts, crankcase ventilation. Cooling system: necessity and requirement of an efficient cooling system, types and different parts of a cooling system, functions of water pump, fan radiator and radiator cap, fan belt, thermostat valve ,temperature gauge and hose pipes.Different components of an air intake system such as air cleaner, pre-cleaner, supercharger and intake manifold and their functions, components of an exhaust system such as exhaust manifold, muffler and their functions.

B. Tractor

Availability of indigenous tractors, models and horse powers, role of tractors in farm mechanization. Familiarization with various components, gagues instruments and controls of tractors. Safety in driving tractors and road signals.

C. Power Transmission

Clutch function, types of clutches, various components and working of single and dual clutch systems, clutch adjustment. Gear box: principles of gearing, types of gear boxes, different components, speed ratio.Differential and final drive, principles of operation, function of a differential lock, P.T.O. drive its position and operational control.

D. Other Systems

Steering system and front axial, different components of the system, types of steering, gear box of different makes of tractors. Brakes: Function of a brake system, classification of brakes, working of a hydraulic brake system. Tyres, tubes and wheel ballasting, constructional features of pneumatic tyres, size and ply rating air inflation technique, size of rim, retreading of tyres. Electrical system, different components of an electrical system and their placement on tractor, function of storage battery, dynamo, cut-out, starter and their proper maintenance. Engine trouble shooting,

E. Hydraulic System and Implement Hitching

Function and merits of a hydraulic system over a mechanical system, function of hydraulic controls. Hitching of trailers, Semi-mounted and mounted implements.

POWER TILLER, IRRIGATION EQUIPMENT & RENEWABLE ENERGY
2ND YEAR
THEORY –II

Total No. of theory periods =34 **Marks-50.**

A. Power Tiller

History and development of power tillers, importance of power tiller in Indian agriculture, Working principles of power tiller, different models of indigenously produced power tillers, their comparative specifications, familiarization with general construction of power tillers, power transmission, steering, various controls and operational techniques, various uses of power tillers.

B. Rotavator and other Matching Implements of Power Tiller

Types of rotavators, Parts and power transmission, materials of construction, adjustment of rotavators for better performance, maintenance and safety measures. Matching implements like mould board ploughs, reversible plough, post hole diggers, SCFD, pump, boom sprayers, reapers, axial flow threshers etc.

C. Electric Motor

Fundamentals of electricity, units of measurements. Types of electric motors used in different pump sets for irrigation, tube wells, threshers, etc. Selection of electric motors.Care, maintenance and installation of electric motors, safety precautions in handling electrical appliances and motors. Use of volt meters, ammeters, megger, multimeter, checking a circuit, diagnosis of burnt-out motors, starter, installation of electric motor, checking of circuit, starter fitting and setting rotational directions of motor. Trouble shooting of electric motors and periodical maintenance.

D. Irrigation Equipment

Importance of irrigation and methods of irrigation. Types of pumps- centrifugal, reciprocating, etc., principles of operation and their constructional details. Selection of pumps for different irrigation systems like conventional, sprinkler and drip irrigation. Estimation of head, discharge and power requirement.

D. Renewable Energy

Introduction to various types of renewable energy and their importance in Indian agriculture. Use of renewable energy sources like bio-gas, wind energy and solar energy in farms. Working principles of renewable energy gadgets like solar heater, solar dryer, wind mill and bio-gas plants. Common faults and corrective measures of those gadgets.

TRACTORS AND THEIR SYSTEMS

SECOND YEAR
PRACTICAL –I

Total No. of Practical classes = 68 **Marks -100**

A. **Engine Overhauling**

Dismantling of engine, Cleaning and inspection of various principal parts. Taking measurements of cylinder liner, piston, piston rings, piston pin, small and big end bearings of connecting rod, crank pins and cam shaft journals and bores to assess wear and tear for reconditioning and replacement. Fitting of liner, piston rings and connecting rod, inserting piston assembly into liner and tightening of big end bearing at required torques. Assembling cam shaft, checking timing gear chain and timing. Reconditioning of cylinder head, de-carbonising, checking valves and springs, replacement of worn out valve seats, seat cutting and lapping, fitting valve guide and valve spring, checking valve seat for leakage, checking and fitting of a rocker arm assembly.

Tightening of cylinder head with proper sequence and torque, adjustment setting of tappet clearance and assembling other attachments. Reconditioning of water pump, fan, checking of radiator, hoses etc. and their assembly. Checking of fuel and oil pumps for proper functioning and repair and calibration if required. Testing and pressure setting of injectors. Replacement of fuel and oil filters, damaged hoses, tightening of clamps, nuts and bolts, filling of fuel, oil and water, final checking lever if any. Starting operation and observing performance.

Visit to reputed repair and service workshop to familiarize with techniques of crank shaft grinding, honing, pump calibration etc.

C. Engine Trouble Shooting

Cause and remedy of engine troubles. Does not start, irregular performance and lack of power, smoky exhaust, engine suddenly stops/ stills/engine knocking, overheating, low and high oil pressure, non functioning of various gauges etc,

D. Tractor Systems

Familiarization with different component systems and controls of a tractor. General cleaning, oiling and greasing of tractor, Checking and tightening of nuts and bolts. Checking fuel, oil and cooling systems and battery. Checking and inflating tyres, starting. Starting, running and stopping of engines, observation of different gauges and controls for functioning. Driving practice in forward and reverse direction. Familiarization with functioning of different systems like fuel, lubrication, cooling, hydraulic and electrical, their defects and remedies. Dismantling, inspection, repair, installation and adjustments of clutch, gear box, differential and final drive. Repair and adjustments and servicing of steering systems, front axle and braking system.

POWER TILLER, IRRIGATION EQUIPMENT & RENEWABLE ENERGY

SECOND YEAR

Practical – II

Total No. of Practical classes =68 **Marks -100**

A. Power Tiller

Dismantling and assembling of major components of power tiller, their adjustments, repair, trouble shooting.

B. Rotavator and Matching Implements

Dismantling and assembling of rotary tiller, their adjustments and repair. Study of different adjustments of power tiller matching implements like mould board ploughs, reversible plough, post hole diggers, SCFD, pump, boom sprayers, reapers, axial flow threshers etc.

C. Electric Motors

Practice in the use of voltmeters, ammeters, megger, multimeter for checking of electrical circuits. Installation of electric motor, Setting of rotational direction of motor. Trouble shooting, periodic servicing and off season storage of electric motors.

D Irrigation Equipment

Study of different types of pump-sets used for irrigation, Dismantling of centrifugal and reciprocating pumps, reconditioning/replacement s of damaged/worn out parts assembly of a centrifugal pump. Installation of a pump, prime mover, fitting of pumps, valves, pulleys and checking for correct alignment, priming operation and trouble shooting of centrifugal pump sets, carrying out periodical servicing.

D. Renewable Energy Gadgets

Study of different types of solar heaters/dryers, horizontal axis and vertical axis wind mills and different types of bio gas plants like Deenabandhu, KVIC and others.

SUGGESTED LIST OF REFERENCE BOOKS

1. Hajra Chaudhary S.K., Hajra Chaudhary A.K. and Nirjhar Roy. Elements of Workshop Technology. Media Promoters and Publishers Pvt. Ltd. Mumbai - 400007
2. Hicks. Pump Operation and Maintenance. Tata McGraw Hill Publishing Company Limited, New Delhi
3. Jain S.C. and Rai C.R. Tractor Engine Maintenance and Repair. Tata Mc-Graw Hills Publishing Co.Ltd., New Delhi
4 Michael A.M. and Ojha, T.P. Principles of Agricultural Engg, Vol. I and Vol.II. Jain Brothers New Delhi.
5 Nakra C.P. Farm Machines and Equipments – Dhanpat Rai and Sons, Nai Sarak, Delhi – 11006.
6 Sahay J. Elements of Agricultural Engineering, Agra Book Company, Patna.
7. Ghosh, R K and Swain, S. Practical Agricultural Engineering, Naya Prakash, Bidhan Sarani, Kolkata-700006

   Bhattacharya, T.K. A Work Book of Practical Farm Machinery. Vol. I & II. Saroj Prakashan, Allhabad.
8 Khandelwal, K.C. and Mahdi, S.S. Biogas Technology, A practical Hand Book, Vol. I, Tata McGraw Hill Publishing Company Limited, New Delhi.
9 Rai, G.D. Renewable Energy Sources. Khanna Publishers, New Delhi.
10 Rai, G.D. Solar Energy Utilization. Khanna Publishers, New Delhi.
11 Teaching Aids: Cut section, Charts and flow diagrams, Charts of Engine, Tractors, Power Tiller, combine,

   Mopeds, sprayer, duster and electric motorCut sections models of engine, electric motor, sprayers, Power tiller and tractor. Video films and slides.

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