HIGHER SECONDARY SCHOOL SYLLABUS
FOR CLASSES 11 & 12

NAGALAND BOARD OF SCHOOL EDUCATION
KOHIMA – 797001
Post Box No. 613

Effective from the academic session 2009 for class 11 and the academic session 2010 for class 12.

Note: The Board reserves the right to revise the curriculum and the syllabi as and when it deems necessary.

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PART – A:

ELIGIBILITY OF CANDIDATES

1. Admission of students to a registered institution of the NBSE:

1.1 A student seeking admission to a class in a registered institution will be eligible for admission to that class if he:-

(i) has been studying in an institution registered with NBSE or member board of Council of Boards of School Education in India (COBSE),

(ii) has passed qualifying or equivalent qualifying examination making him eligible for admission to that class and

(iii) produces: -

(a) Cumulative Record Cum Schooling History (CRSH)
(a migrating student shall produce the School Leaving Certificate or Transfer Certificate signed by the Head of the Institution last attended and countersigned by the District Education Officer or his equivalent), and

(b) document(s) in support of having passed the qualifying or equivalent qualifying examination.

Explanation: -

(a) A person who has been studying in an institution which is not a member board of COBSE shall not be admitted to any class of the registered institutions on the basis of Certificate(s) of such unrecognized institutions attended by him earlier.

(b) 'Qualifying Examination' means the passing of that examination which makes a student eligible for admission to a particular class.

(c) 'Equivalent Examination' means an examination conducted by a recognised Board/University and is recognised by NBSE as equivalent to the corresponding examination conducted by this Board.

1.2 No person who is under the sentence of rustication or is expelled from any Board/ University/School or is debarred from appearing in the examination for whatever reason by any Board/University shall be admitted to any class nor shall be permitted to appear at any examination under NBSE.

1.3 No student shall be admitted or promoted to any subsequent higher class unless he has completed the regular course of study of the class to which he was admitted at the beginning of the academic session and has passed the examination at the end of the concerned academic session, qualifying him for promotion to the next higher class.

1.4 No student shall be admitted in Class 11 or above in an institution registered with the Board after the specified date.

The candidate shall complete the required percentage of attendance (80%) for each class to make him eligible for the examinations.

1.5 Admission: Specific Requirements

Admission to Class 11 in a registered institution shall be given only to such a student who has passed: -

The High School Leaving Certificate Examination (Class 10) conducted by this Board or an equivalent examination conducted by a member board of COBSE and recognised by this Board as equivalent to its High School Leaving Certificate Examination.

1.6 Admission to Class 12

(i) Admission to Class 12 shall be given to students who:

~ has completed a regular course of study for Class 11, and

~ has passed Class 11 examination from an institution registered with NBSE.

(ii) Admission to migrating students to Class 12 is not allowed.

However, the Chairman shall have the authority to decide direct admission to Class 12 on special circumstances.

2. Admission to Examinations

2.1 Admission to Examinations: Regular Candidate

Higher Secondary School Leaving Certificate Examination will be given to such regular candidates who have submitted their duly completed applications for admission to the concerned examination, and/or his name in the manner prescribed by the Board, along with the prescribed fee forwarded to the Controller of Examinations by the Head of the Institution.

2.2 Management of Examinations

(i) It is mandatory for an institution registered with the Board to follow the rules and guidelines of the Management of Examinations of the Board.

(ii) No registered institution shall endeavor to present the candidates who are not enrolled as on 1st July nor will it present the candidates of its unregistered institutions to any of the Board's Examinations.

(iii) If the Board has reasons to believe that a registered institution is not following the Board's rules and norms, the Board will resort to penalties as deemed fit.

2.3 A Regular course of Study

(i) The expression "a regular course of study" means at least 80% of attendance in the classes held, counted from the day of commencing/teaching of Class 11/12, up to the 1st of the month preceding the month in which the examination of the Institution/Board commences.

Candidates taking up a subject(s) involving practicals shall also be required to have at least 80% of the total attendance for practical work in the subject in the laboratory.

Heads of institutions shall not allow a candidate who has opted subject(s) involving practicals to take the practical examination(s) unless candidate fulfill the attendance requirements as given in this Rule.

(ii) The candidates who had failed in the same examination in the preceding year and who rejoins Class 11/12 shall be required to put in 80% of

attendance calculated from the 1st of the month following the publication of the result of that examination by the Institution/Board up to the 1st of the month preceding the month in which the examination of the Institution/Board commences.

2.4 Requirement of attendance in subjects of Internal Assessment

(i) No student from a registered institution shall be eligible to take the examination unless he has completed 80% of attendance counted from the opening of Class 11/12 up to the 1st of the month preceding the month in which the examination of the Institution/Board commences in the subjects of internal assessment.

(ii) The Chairman, NBSE shall have powers to condone shortage of attendance in subjects of internal assessment.

2.5 Rules for Condonation of shortage of attendance

(i) Shortage of attendance up to 15% only may be condoned by the Chairman. Cases of candidates with attendance below 65% in Class 12 shall be considered for condonation of shortage of attendance by the Chairman only in exceptional circumstances created on medical grounds, such as candidates suffering from serious diseases like Cancer, AIDS, T.B. or any other disease or injury requiring long period of hospitalization.

(ii) The head of registered institution shall refer a case of shortage within the above prescribed limit of condonation to the Board, either with the recommendations or with valid reasons for not recommending the case.

(iii) The following may be considered valid reasons for recommending the cases of the candidates with attendance less than the prescribed percentage:

(a) prolonged illness;

(b) loss of parents/legal guardian or some other such incident leading to his absence from the school and meriting special considerations;

(c) any other reason of similar serious nature; and

(d) authorized participation and/or representation of the State in sponsored Tournaments, Sports Meets, Seminars, Exhibitions, etc. of not less than inter school level, NCC, Scouts & Guides and NSS Camps, etc. within or outside the state. The days of journey for such participation shall be counted as full attendance.

2.6 Detaining of eligibility candidates

The Heads of the registered institutions can detain candidates from appearing the examination of the Board on account of any of the following reasons:

a) if there is no sign of academic improvement or if the student has a deteriorating performance in the weekly/monthly tests and terminal examinations.

b) gross misconduct and insubordination to the institutional authority.

c) failure to attend coaching classes.

d) non-payment of fees (school fees, examination fees, etc.).

e) failure to abide by the rules of the institution.

f) or any other reason which the head of the institution necessitates to take an action.

2.7. Admission to Examinations : Private Candidates

(i) A candidate who had failed at the Higher Secondary School Leaving Certificate Examination of the Board will be eligible to reappear at a subsequent examination as a private candidate as per the current syllabus and textbooks prescribed for the examination of the year in which he will reappear.

(ii) Private candidates shall not be allowed to opt/appear a subject (even if the subject is one of the subjects for the said examination) which he has not taken or studied.

(iii) Those regular candidates who have failed at the Class 11 Promotion Examination of the NBSE or any other member Board of COBSE shall not be permitted to appear the Higher Secondary School Leaving Certificate Examination as private candidates.

2.8 General

A candidate who has been expelled or is under punishment or rustication or is debarred for appearing in or taking an examination for any reason whatsoever by this Board or any member board of the COBSE, shall not be permitted to appear the Higher Secondary School Leaving Certificate Examination as private candidates.

PART – B

1. SCHEME OF STUDIES

There shall be 3 (three) streams i.e. Arts, Commerce and Science at the higher secondary level. There will be 6 (six) external subjects including 1 (one) additional subject and 3 (three) internally assessed subjects. **The additional subject is optional.**

The subjects to be taught in the different streams are as follows:

1.1 Subjects.

The subject of studies at the higher secondary level shall be as follows:

A. ARTS

I. *Compulsory*

(i) English (ii) MIL/Alternative English

II. *Elective (any three):*

(i) History (ii) Political science (iii) Economics
(iv) Psychology (v) Philosophy (vi) Sociology
(vii) Geography (viii) Mathematics (ix) Education
(x) Music (xi) Computer Science (xii) Informatics Practices

III. *Internally Assessed Subjects*:

i) Environmental Education ii) Work Education iii) Physical and Health Education

IV. *Additional subject:*

A subject given in serial no. II (Elective) which is not opted as an Elective with conditions.

Note: (1) Computer Science can be opted by only those students who have Mathematics as an elective subject.

(2) Students cannot opt the following subjects together:
(a) Education and Psychology
(b) Computer Science and Informatics Practices.

(3) A candidate can also offer an additional subject from the given elective subjects but subject to fulfillment of the condition laid down in point no. 2.

(4) The additional subject shall replace any of the failed elective subject.

B. COMMERCE

I. *Compulsory*

(i) English (ii) MIL/Alternative English (iii) Accountancy
(iv) Business Studies

II. *Elective (any one):*

(i) Economics (ii) Mathematics (iii) Entrepreneurship
(iv) Fundamentals of Business Mathematics (v) Computer Science
(vi) Informatics Practices

III. *Internally Assessed Subjects*:

(i) Environmental Education (ii) Work Education,
(iii) Physical and Health Education.

IV. *Additional subject:*

A subject given in serial no. II (Elective) which is not opted as an Elective with conditions.

Note: (1) Computer Science can be opted by only those students who have Mathematics as an elective subject.

(2) Students cannot opt the following subjects together:
(a) Computer Science and Informatics Practices.
(b) Fundamentals of Business Mathematics and Entrepreneurship

(3) A candidate can also be offered an additional subject from the given elective subjects but subject to fulfillment of the condition laid down in point no. 2.

(4) The additional subject shall replace the failed elective subject.

(5) **The students should be advised that the subject Economics is an**

important component in the study of Commerce.

SCIENCE

I. *Compulsory*
(i) English (ii) MIL/Alternative English (iii) Chemistry (iv) Physics

II. *Elective (any one):*
(i) Biology (ii) Mathematics (iii) Biotechnology (iv) Computer Science
(v) Informatics Practices.

III. *Internally Assessed Subjects*:
i) Environmental Education ii) Work Education iii) Physical and Health Education

IV. *Additional subject:*
A subject given in serial no. II (Elective) which is not opted as an Elective with conditions.

Note:(1) Computer Science can be opted by only those students who have Mathematics as an elective subject.
(2) Students cannot opt Computer Science and Informatics Practices subjects together:
(3) A candidate can also offer an additional subject from the given elective subjects but subject to fulfillment of the condition laid down in point no. 2.
(4) The additional subject shall replace the failed elective subject.

1.2 Instructional Time and Instructional Period:

~ There should be a minimum of 180 working days in a year.
~ The duration of each period should be 45 minutes.
~ The instructional period should be distributed to ensure that the whole syllabus is transacted.
~ The institutions while planning its instructional time should provide time for project works and out door activities.

1.3 Medium of Instruction:

The medium of instruction and examination for all subjects shall be English except for the Major Indian Languages and Modern Indian Languages (MILs).

1.4 Selection of a particular scheme of studies:

It is desired that the students choose their elective subjects keeping in view their future course of higher studies. Institution shall therefore be responsible for ensuring the correct selection of subjects to meet the university or professional requirements of a student(s).

2. SCHEME OF EXAMINATIONS:

2.1. Nature of Examination :

The pattern of higher secondary examinations shall be as follows:-

(a) Class 11

The examination shall be conducted from the syllabus of Class 11.

i) ~ The date and time of the examinations shall be fixed by the Board.
~ The question papers shall be set by the Board.
~ The evaluation and provisional result shall be done by the institution.
~ The declaration of result by the institution shall be done after it is approved and countersigned by the Controller of Examinations, NBSE or a senior official of the NBSE who is dealing with examinations.
~ The following valued answer-scripts of all the subjects shall be submitted along with the result for approval:
3(three) scripts within 0-32% marks
3(three) scripts within 33-50% marks
3(three) scripts within 51-100% marks

ii) ~ The internal subjects i.e., Work Education, Physical and Health Education and Environmental Education shall be assessed internally by the institutions on a five point grade scale.
~ The grades of the internally assessed subjects shall be forwarded by the institutions at the time of submitting the results of mid-term examination of class 11.
~ These grades shall be taken into consideration in deciding the result.
~ The institutions shall maintain the achievements and progress of the students in the Cumulative Record Cum Schooling History Book.
~ These records are subject to scrutiny by the Board.

iii) Details of subjects, marks and duration of examination:

a. External Subjects:

	Subject	*Marks*	*Duration*
~	English	100	3 hours
~	MILs/Alt. English	100	3 hours
~	Subject without practical	100	3 hours
~	Subject with practical		
	Theory	70	3 hours
	Practical	30	3 hours

b. Internally assessed subjects—

These subjects shall be continuously and comprehensively evaluated by the institution. The performance of the student shall be given in grades.

b) Class 12 (Higher Secondary School Leaving Certificate Examination)

i) The Board shall conduct the final examination of Class 12 as Higher Secondary School Leaving Certificate Examination (HSSLC).
~ The examination shall be based on the syllabus for Class 12 and the result shall be determined on the basis of the marks obtained at the HSSLC Examination.

ii) Details of subject, marks and duration of examination:

a. External Subjects:

	Subject	*Marks*	*Duration*
~	English	100	3 hours
~	MILs/Alt. English	100	3 hours
~	Subject without practical	100	3 hours
~	Subject with practical		
	Theory	70	3 hours
	Practical	30	3 hours

b. Internally assessed subjects:

These subjects shall be continuously and comprehensively evaluated by the institution.

~ The performance of the student shall be given in grades.

~The grades of the internally assessed subjects shall be forwarded by the head of the institution to the Board at the time of submitting the forms of the HSSLC Examination.

~ These grades shall be taken into account to determine the result and rank.

2.2 Pass criteria and classification of successful candidate:

i) The pass criteria for the examinations of classes 11 and 12 shall be as follows:

~ 33 marks in each subject not involving practical

~ 21 marks in theory and 12 marks in practical separately for those subjects involving practical.

~ 165 marks in the aggregate out of 500 marks.

ii) Classification of result is:-

III division 165 to 224 marks

II division 225 to 299 marks

I division 300 and above

Star marks:

~ with additional subject : 480 marks and above in aggregate.

~ without additional subject : 400 marks and above in aggregate.

Letter mark 80% or above in a subject.

3. MINIMUM ATTENDANCE FOR CLASSES 11 AND 12:

A student pursuing a regular course must have 80% or above class attendance to his/her credit in order to sit for the promotion or final examination.

4. REGISTRATION:

A student who had enrolled in the higher secondary classes under this Board shall register himself/herself with the Board by applying in the prescribed form.

Registered students shall be issued a registration card.

Students who are not registered with the Board will not be allowed to sit at the Board's examinations.

5. CHANGE OF SUBJECT:

A student, after passing Class 11, shall be allowed to change his/her subject with the prior approval of the Board in the following subjects: (i) MILs to Alternative English ii) Psychology to Education (iii) Computer Science to Informatics Practices (iv) Bio-Technology to Biology.

For such cases, approval shall be sought on or before 30th April of the academic year.

6. CHANGE OF STREAM:

The provision of change of stream is applicable for the failed candidate (s) of HSSLC Examination. Such a candidate shall seek prior permission from the Board to join in class 11.

Failed candidates of class 11 are eligible for change of stream. Such candidates shall seek prior permission from the Board for change of stream before taking admission.

REGISTRATION OF SUBJECT

Institutions shall obtain prior permission from the Board for registration for the subjects prescribed in the syllabus to be taught.

Institutions shall not forward candidates to the examinations in subjects for which they are not registered. Such cases shall be rejected.

VOCATIONAL SUBJECT:

Physical verification shall be done by the Board before permission is granted to an institution to impart vocational subject.

PART – C

AREAS OF INTERNAL ASSESSMENT

As per the scheme of studies given for higher secondary level, the following areas are for internal assessment to be done by the respective institutions.

1. Environmental Education
2. Work Education
3. Physical and Health Education.

The purpose of assigning these areas to internal assessment is that these should not be reduced to mere certification but should received careful handling so as to encourage growth of the student into a more wholesome personality.

The academic achievement should be fully supplemented with growth in

other areas of human personality which is far more worthwhile in dealing with the life situations.

Therefore, the evaluation shall be done on continuous and comprehensive basis. The evaluation of internal assessment subjects mentioned above should be done on a five point grade scale as stated below:

Grade A	- Excellent	75% to 100%
Grade B	- Very good	60% to 74%
Grade C	- Good	45% to 59%
Grade D	- Satisfactory	33% to 44%
Grade E	- Unsatisfactory	32% and below

1. ENVIRONMENTAL EDUCATION

I. Why environmental education:

The need for conserving natural resources and using them wisely is man's greatest need and concern today to save the planet Earth and its inhabitants from total disaster. This has happened because of the advancements in science and technology and man's greed for power, wealth and prestige coupled with the need to feed the burgeoning population that has done untold damages to the environment.

What we see today is man under the guise of development exploiting nature beyond its limit for self gain and not caring or unmindful of the damage it is doing to the human race. Global warming is one such example which is beginning to threaten the relationship between man and nature. This damage is quite impossible to assess and reverse.

Realising the need to conserve, preserve and protect the environment as well as to strive towards a life in harmony with nature, environmental issues have now become an important component of the school curriculum where it needs to prepare its students to meet the new challenges i.e. to equip the learners to develop necessary skills and attitudes and to motivate them to work together and individually for a better man-nature relationship. This will not only help them to

develop a balanced view of the relationship between environment and development but will also help them to commit themselves to protect the environment.

It is with this aim in mind that the study of Environmental Education has been introduced as a subject of study which will be assessed/evaluated internally by the respective institution.

II. Objectives of Environmental Education:

i) to develop an in-depth understanding of various environmental issues and concern of national and global importance;

ii) to develop a balanced view of the relationship between environment and development;

iii) to understand basic concepts related to sustainable development vis-à-vis improvement of quality of life;

iv) to develop a deeper concern for the environment and a sense of commitment and responsibility to take proactive action;

v) to appreciate the variety in living organism and recognize India as a mega diversity nation;

vi) to appreciate the role of the individual, community, national and international agencies in resolving environmental problems;

vii) to practise ways of bringing about qualitative improvement in the environment by assuming leadership role;

viii) to identify self with one's environment with an attitude to personally contribute towards its improvement;

ix) to respect customs and traditions related to local conservation practices and accept indigenous eco-friendly technologies;

x) to develop skills to undertake and participate in investigative studies on various environmental issues; and

xi) to motivate them and participate in social and community activities in dealing with environmental problems.

III. Syllabus:

The following units shall be taught under Environmental Education:

Unit- I : Man and Environment/Biodiversity
Unit- II : Environment and Development/Environmental Management
Unit-III : Environmental Pollution and Global issues/Sustainable Development
Unit -IV : Energy/Sustainable Agriculture

The detailed syllabus is given in the textbook.

IV. Areas of assessment:

Environmental Education have two areas i.e. (i) theory of 70 marks and (ii) practicals of 30 marks where students have to be imparted knowledge about environment and its problems as well as helping them to develop the necessary skills and attitudes through practicals in the form of project works/ case studies.

V. Evaluation:

In Environmental Education, students are to be evaluated continuously through written examination, project works and case studies.

~ The periodicity of evaluation shall be decided by the respective

institution.

~ In a year, the students are required to undertake and complete 2 (two) case studies and 1 (one) project as specified in the text book/syllabus.

~ The Board shall supply the question paper of 70% weightage of marks for Class 11 Promotion Examination and HSSLC Examination which shall be evaluated internally by the institution.

~ Every student is required to possess the book on Environmental Education and make practical use of it for his/her own benefit and also for the society.

Recommended book: Environmental Education by Goyal Brothers Prakashan, F-75, Green Park Main, New Delhi – 110016.

2. WORK EDUCATION

I. Concept of Work Education:

The National Policy on Education 1986 has conceived Work Education as purposive and meaningful manual work that results in goods or services useful to the society.

Work Education comprises activities relating to services, goods and community development in various areas of human needs such as health and hygiene, food, clothing, shelter, recreation and social service in accordance with mental abilities and manual skills of students at various stages of education and the availability of local resources.

The policy visualize intensive participation of students in production and service-oriented projects.

It assigns equal importance to community work/social service for creating social awareness and concern for the welfare and development of the local community as well as the society.

The essential attribute to Work Education is, therefore, its manual character which means that the students are to work with their hands and thereby develop a sense of dignity of labour and stamina for hard work.

Manual work therefore, should be purposive and educative in that it should help to develop knowledge, understanding attitudes, personal and social qualities and skills related to the world of work.

II. Objectives of Work Education:

The objectives of Work Education are:

A. COGNITIVE DOMAIN: (Knowledge and understanding).

i) identify the needs and those of the family and community in respect of food, health and hygiene, clothing, shelter, recreation and social service,

ii) know the sources of raw materials and understand the use of tools and equipments in the production of goods and services,

iii) understand scientific facts and principles involved in various forms of work, the process of planning and organizing productive works understand his role in productive situations in terms of production process and skills.

B. PSYCHOMOTOR DOMAIN: (Skills)

i) develop skills for the selection, procurement, arrangement and use of tools and materials for different forms of productive work,
ii) develop skills for the application of problem solving methods in productive work and social service situations,
iii) use his creative faculties for divising innovative methods and materials.

C. AFFECTIVE DOMAIN: (Attitudes and values)

i) develop respect for manual work and have fellow feeling for manual workers,
ii) develop proper work habits and values such as regularity, punctuality, discipline, honesty, love of excellence and dedication to duty,
iii) develop a deeper concern for environment and a sense of belonging, responsibility and commitment to the society,
iv) appreciate the utility of productive works and services to the community.

III. Organisation of Work Education:

The content of work education will be based on the needs of the pupils, the resources available in the community and the facilities available in the institution. Since these will differ from place to place, no fixed programme is prescribed uniformly.

The institution may plan its work education activities by choosing programmes from the following essential areas which cover the following six aspects of human needs:

i) Food ii) Shelter iii) Heath and Hygiene
iv) Culture and Recreation v) Clothing vi) Social Service.

The above mentioned aspects shall be the main areas of assessment.

In this connection, it may be noted that in pursuance of the objects of the National Literacy Mission, the Government of India has set up a Special Adult Literacy Drive (SALD) as a measure to remove illiteracy through massive involvement of students. This drive is to be made a part of work education programme specially for students of higher secondary stage.

This activity in a planned manner may be taken up in consultation with the local authorities. Similarly under health schemes to develop awareness on abuses of drugs/ alcohol/ smoking/danger of AIDS etc., suitable programmes may be planned in consultation with the Health Department.

IV. Management of Work Education:

For effective implementation of Work Education Programme, the following three dimensions should be followed:

(i) Scheme of work for the year.
(ii) Provision of funds and availability of resources-both expertise and materials.
(iii) Orientation programmes for teachers.

To look after these three dimensions of Work Education in schools, it is essential to have a Work Education Committee under the Chairmanship of the

Head of Institution consisting of experts, teachers and students.

This Committee shall see to the following:

(i) Preparation of the scheme of work for the year in a prescribed proforma which may be designed as given below:

Class: Name of the institution :_____

Year:

	re	e	dimensions should be fol		ow
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Provision of funds and availability of resources-both expertise and materia ls.□□□□□ (iii)□Orientation programmes for teachers.□□ □□□To look after th ee dimensions of Wor

k Education in schools, it is essential to have a Work Education Committe e under the Chairmanship of the Head of Institution consisting of experts, tea chers and students.□□ □□□□□□□□□□This Committee shall see to the follo wing: □(i)Preparation of the scheme of work for the year in a prescribed profor ma which may be designed as given below:□Class: Name o ution□:_____□Yea r :

□□□□□□□□□Activities to be covered□□□□

□□□□□□□□□Area□Work Education Activity□□□□□□□□□□□□□□□□□(ii)Pre ration of an estimate of funds for consumable and non-consumable mater ials for performing the work education activities and use of resources both me n and materials. □(iii)Evaluation and monitoring of work education pro gramme periodically.□ All the teachers of the institution are expected to parti cipate in the Wo

rk Education Programmes. For outside work education programme, the time sch edule may be outside school hours as planned by the institution. Communi ty resources

may be utilised by the institution for effective implementation of th e Work Ed

ucation Programmes.**3. PHYSICAL AND HEALTH EDUCATION *I. Th jectives of Physical and Health Education are:***□□□i)□to know th e importance of athletics, gymnastics and major games;□□

ii) to acquaint students with the components of phys ical and health education and their complementary role in the wholesome growth of personality;□□□iii)□to establish relationship between emotional needs of ad escence and their mental health;□□iv)□ to suggest improvement in personal hea ractices and environmental conditions □including inter-personal relationship for optimal growth and development; □v) to parti cipate in athletics, gymnastics and in some major games for body fitness; vi)□to realise the value of discipline, punctuality, respect for others, obser vance of rules and fair play as internal part of l i fe and□vii) to develop team spirit and to become co-operative.***II.***

Resources & Sports Department and induct the department officers as members of the committee on Physical and Health Education.

(iii) to motivate the students to play games outside school hours and the institution should extend such facilities to those students who are interested in improving their performance.

(iv) to observe special occasions e.g., Better Health for all, Dangers of Pollutions, Preservation of natural resources, Abuse of alcohol, drugs, smoking and other bad health practices, awareness programme for communicable diseases, danger of AIDS, Safety Week, etc. inside and outside the institution.

(v) to make an endeavour to inform the students through special bulletin about the news related to health education, national and international game competitions.

The head of the institution shall select only those activities under Physical and Health Education areas which are feasible and practicable within the resources available.

Information

Students shall be assessed for their development on the basis of their participation, interest and level of involvement in the areas of Work Education, Physical and Health Education and even in Environmental Education (besides the testing parameters listed in the theory and practical areas).

Maintenance of records or achievements in the internally assessed subjects:

All institutions shall maintain the records of the assessment done in a register listing the names of all students. The records of assessment shall be done separately for each activity.

Monitoring of internally assessed subjects:

The Board shall monitor the implementation and achievements of the internally assessed subjects so as to raise the credibility and reliability standards of these subjects.

This monitoring shall be in the form of inspecting and verifying the achievements of students or conducting camps where the recorded achievements of the students can be tested.

PART – D

ENGLISH

OBJECTIVES:

1. **Reading**
   On reading a text-prose and poetry, the students should be able to:
   - perceive its overall organization,
   - discriminate between the main and subordinate points, and know how they interrelate;
   - understanding the structure of information in it, whether the information presented is by generalization, or by classification or by contrast and comparison,
   - draw inferences from it, for example, arriving at conclusion based on the given information,
   - evaluate/discover the writers' attitude,
   - determine a role of lexical structure, its literal and figurative use,
   - identify elements of style as humour, pathos, satire and irony,
   - distinguish between the direct and implied meaning,
   - interpret/identify tabular diagrammatic presentation of information.

2. **Writing**: By the end of a course, the students should be able to:
   - write correctly
   - express an idea coherently in a single paragraph,
   - write factual description of objects, places, persons etc.
   - describe a process(eg. making tea, mending a bicycle puncture)
   - write single narrative pieces,

- write a critical appreciation of a piece of literature, eg. a poem or a short story,
- write a letter of different kinds,
- report events and experiments,
- make notes using abbreviations, symbols etc.,
- write an essay/compose a longer piece of reflective, prescriptive, expository, imaginative on a given topic.

3. **Grammar**: By the end of the course, the students should be able to use the following correctly in a given context:
    - the right use of tense,
    - active and passive constructions,
    - to use punctuation marks correctly, parenthesis, indexing, underlining and use of abbreviations.

CLASS - 11
ENGLISH

EXAMINATION SPECIFICATIONS

Unit-wise weightage
Time: 3 Hrs. **Marks: 100**

Sec	Unit/Areas of Learning	Periods	Marks
A	Reading Unseen Passage (One)	12	
LA	**SS - 11□ ENGLISHEXAMINATION SPECIFICATIONS□**		

Marks: 100

□□□**Sec** **Unit/Areas of Learning**

Periods□Marks□□□□A□Reading Unseen Passage (One)

□□□□□□□B□Writing 46□□□□

C

□Grammar

26□□□□□□□D□Textual Questi

ons□(i)□Tex

tbook 96□(ii)□Supplementary

Reader □□35□ 15 50□□□□□**Total**

180 □ 100□SE

CTION - A□Reading unseen Passages for Comprehension

□□□□□ **12 periods (12 marks)**One unseen passage with a variety of questio

n

s includi

	2 marks for voc	abulary such	as words forma	tion and inferr
me	an	in	g. The total length of the passage s hould be around 600 words.□1. The passage	co
			any of the	fol

The passage should have about 600 words carrying 12 marks.

SECTION - B

WRITING **46 periods**

(23 marks)

3. Write items related to the workplace (minutes,reports,preparing CV's)

05

4. One out of two compositions based on a visual and/or verbal input (in about 100- 150 words). The output may be descriptive, argumentative in nature such as an article for publication in a newspaper or a school magazine or a speech. **08**
5. Writing one out of two letters based on given input (a) letters to the editors (giving suggestions, opinions on an issue of public interest) or (b)application for a job. **10**

SECTION - C

GRAMMAR **26 periods**

(15 marks)

6. Grammar: To use grammatical items accurately and appropriately, specifically, Tenses, Voices, Modals and Common Errors (apostrophe, punctuation)

SECTION - D

TEXTUAL QUESTIONS **96 periods (50 marks)**

Questions on the prescribed textbooks will test comprehension at different levels: literal, inferential and evaluative.

CLASS - 11
ENGLISH

Unit-wise weightage
Time: 3 Hrs. **Marks: 100**

Units	Marks
I. Prose	20
II. Poetry	15
III. Supplementary Reader	15
IV. Grammar and Composition	50
Total	**100**

Unit I. Prose
(20 marks)

1.	Our Family Creed	John D. Rockfeller. Jr.
2.	A Father's Letter	William Hazlitt
3.	The Portrait of a Lady	Khushwant Singh
4.	With the Photographer	Stephen Leacock

5. Private Faces — R.K. Narayan

Unit II. Poetry
(15 marks)

1. Ode to Autumn — John Keats
2. A Little Grain of Gold — Rabindranath Tagore
3. The Ballad of Father Gilligan — W.B.Yeats
4. Psalm - I — The Bible
5. The Mountain and the Squirrel — Ralph Waldo Emerson

Unit III. Supplementary Reader
(15 marks)

1. The Open Window — Saki
2. A Dialogue on Civilization — C.E.M Joad
3. Albert Einstein at School — Patrick Pringle
4. The Leopard — Ruskin Bond
5. A Cup of Tea — Katherine Mansfield

Unit IV. Grammar & Composition
(**50 marks)**

1. Grammar: To use grammatical items accurately and appropriately, specifically – Tenses, Voice, Modals, Common Error (apostrophe, punctuation) (**15 marks)**
2. Writing –

(i) Writing Letters
- letters to the editors (giving suggestions, opinions on an issue of public interest) or
- job application

(**10 marks)**

(ii) Composition based on visual and/ or verbal input (in about 100-150 words). The output may be descriptive or argumentative in nature such as an article for publication in a newspaper or a school magazine, a speech.

(**8 marks)**

(iii) Write items related to the workplace (minutes, reports, preparing CV's).

(**5 marks)**

3. **Reading Unseen Passage for Comprehension**
One unseen passage with a variety of questions including 2 marks for vocabulary such as word formation and inferring meaning. The total length of the passage should be around 600 words.
(**12 marks)**

3 The passage could be any of the following two types:
(a) **Factual passage** eg. instructions, description, reports.
(b) **Discursive passage** involving opinion eg., argumentative, persuasive.

Unseen Passage	No. of words	Testing Areas	Marks Allotted
. eg .	., .	argumentative, persuasive.□ □□□Unseen Passage□No. of words□Testi	ng

	mp	re	hension□10	□□□

□□□Vocabulary□02□□The passage should h
a
ve about 600 words c
arrying 12 marks. ***Recommended boo***
ks: *1. □Lasting Impressions – cl*
ass 11□by Anup Kaushal Sandra de So
uza,□Sudeshra Dasgupta,
Reinu Nagarkar.□Macmillan (In
dia) Ltd.□S-C. Gos
wami Roa
d, Pan Bazar,□Guwahati – 781001□Mom
· *ents□Supplementar*
y Reader class 11 & 12□b
y Karuna Kumar,□Macmillan (India
) Ltd.□S – C. Gosw
ami Road, P
an Bazar

,□ Guwahati – 781001

CLASS - 12□ENGLISH□Unit-wise we
ightageTime: 3 Hrs.

M		**arks: 10**	**0□□□Se**
ni	**t/Areas of**	g u	een
	Learning□Period	n	
	s□Marks□□□□□A□Section A□Reading Skills □Readin	s	
se	passages	□□	**□Se**
	and note making30□□□20□	**B**	
n	**B□Advanced Writing Skills** 40	g	
	□□25□□□□**C□Section C**	lis	Rea
	(Prescribed Books)(i) En	h	der
i	Supplement	e 9	
)	ary Read	r	0□
1	5□□□	**□D□Section**	**D**Grammar
0			
10□□□□			

Total□ 180□ 100□□□□SECTION A□Reading unseen Passages and Note-

□□□□□**30 periods (20 marks)**Two unseen passages with a variety of ques
tions including 03 marks for vocabulary such as word formation and inferrin
g
meaning and 05 marks for note-making.□□The total length of the two passages will
be between 950-1200 words. The pass
ages will include two of the following:□(a) **Factual Passages** e.
g. instructions, descriptions, reports.□(b) **Discursive passage** involving opinion
eg.
, argumentative, persuas
ive or □ interpretative text.□(c) **Literary passage** e.g. extract from fict
i
on, drama, poetry, e
s

y or biography.	**SUMMARY – ass -12□□**Uns		een passages□No

A passage of about 600 - 700 words carrying 12 marks and another passage of about 350-500 words carrying 08 marks.

1. A passage to test reading comprehension. The passage can be literary, factual or discursive. The length of the passage should be between *600-700* words.
(**12 marks)**

2. A shorter passage of *350-500* words for note-making and abstraction.
(**8 marks)**

SECTION - B

Advanced Writing Skills **40 periods**
(25 marks)

3. One out of two short compositions of not more than 50 words each e.g. writing formal and informal invitations and replies.
05

4. A report on a factual description based on verbal input provided (one out of two)
(100-125 words).
10

5. Writing one out of two letters based on verbal input. Letter types include:
10
business or official letters (for making enquiries, registering complaints, asking for and giving information, placing orders and sending replies).

SECTION – C

Textual Questions: **90 periods**
(45 marks)

Questions on the prescribed textbooks will test comprehension at different levels: literal, inferential and evaluative.

SECTION – D

Grammar **20 periods**
(10 marks)

Grammar: To use grammatical items accurately and appropriately, specifically – Narration, Adjectives, Prepositions, Sentence connectors.

CLASS – 12
ENGLISH

Unit-wise weightage

Time: 3 Hrs. **Marks: 100**

Units	**Marks**
I. Prose	15
II. Poetry	15
III. Supplementary Reader	15
IV. Advanced writing skills	45
V. Grammar	10
Total	**100**

Unit I. Prose (15 marks)

1. The Price of Flowers — Prabhat Kumar
2. The Awakening of Women — K.M. Panikkar
3. On Being Hard Up — Jerome K. Jerome
4. Machines and the Emotions — Bertrand Russell
5. The Other Side of the Hedge — E.M. Forster

Unit II. Poetry (15 marks)

1. The Message — John Donne
2. The Daffodils — William Wordsworth
3. Once Upon a Time — Gabriel Okara
4. The Man He Killed — Thomas Hardy
5. Miracles — Walt Whitman

Unit III. Supplementary Reader (15 marks)

1. The Face on the Wall — E.V. Lucas
2. Youth and the Tasks Ahead — Dr. Karan Singh
3. The Future is Now: A Zest for Living — Walter F.Strommer
4. The Star — Arthur Gordon
5. On Conduct in Company — Lord Chesterfield

Unit IV. Advanced writing skills (45 marks)

Reading Unseen Prose Passages and Note-Making.

20

Two unseen passages with a variety of questions including 03 marks for vocabulary such as word formation and inferring meaning and 05 marks for

note-making.

The total length of the two passages will be between 1100-1300 words. The passages will include two of the following:

(a) Factual passage eg. instructions, description, reports.

(b) Discursive passage involving opinion eg. argumentative, persuasive or imperative text.

(c) Literary passage eg**.** extract from fiction, drama, poetry, essay or biography

Unseen Passages	No. of words	Testing Areas	Marks Allotted
A1	700-800	Short answer type questions to test local, global and inferential comprehension. Vocabulary.	9 3 **12**
A2	400-500	Note-making in an appropriate format. Abstraction	5 3 **8**

A passage of about 700-800 words carrying 12 marks and another passage of about 400-500 words carrying 08 marks.

1. Writing formal and informal invitations and replies.

05

2. A report on a factual description based on verbal input provided (100-125).

10

3. Writing a letter based on verbal input-business or official letters.

10

Unit V. **Grammar** (**10 marks)**

Grammar: To use grammatical items accurately and appropriately, specifically, – Narration, Adjectives, Prepositions, Sentence connectors.

Recommended books:

1. *Lasting Impressions – class 12*
   by Anup Kaushal Sandra de Souza,
   Sudeshra Dasgupta, Reinu Nagarkar.
   Macmillan (India) Ltd.
   S-C. Goswami Road, Pan Bazar,
   Guwahati – 781001

2. *Moments*
   Supplementary Reader class 11 & 12
   by Karuna Kumar,
   Macmillan (India) Ltd.
   S – C. Goswami Road, Pan Bazar,
   Guwahati – 781001

ALTERNATIVE ENGLISH

Objectives:

- to provide extensive exposure to the variety of writings in English by different authors and poets from different countries.
- to develop sensitivity to the literary and creative uses of language.
- to cultivate the habit of reading and enrich their vocabularies.
- to critically examine a text and comment on different aspects of it.
- keeping in mind the needs of the students, the present syllabus has been prepared to feed them on the variety of the subjects as well as to make them aware of the beauty of the English language.

CLASS – 11
ALTERNATIVE ENGLISH

Unit-wise weightage

Time: 3 Hrs. **Marks: 100**

Units		Periods	Marks
I.	Prose	40	20
II.	Poetry	40	20
III.	Drama	20	10
IV.	Fiction	40	20
V.	Grammar	20	15
VI.	Composition	20	15
	Total	**180**	

100

Unit I. Prose **40 periods**
(20 marks)

i. The Scarecrow – Satyajit Ray
ii. The Letter – 'A' – Christy Brown
iii. What Men Live By – Leo Tolstoy
iv. After Bhopal – Harsh Mander
v. The Luncheon – William Somerset Maugham

Unit II. Poetry **40 periods**
(20 marks)

i. The Kingfisher – W.H. Davies
ii. A Madrigal – W. Shakespeare
iii. Spring Quiet – Christina Rossetti

iv. Mending Wall – Robert Frost
v. Money-Madness – D.H. Lawrence

Unit III. Drama **20 periods**
(10 marks)

The Discovery – Herman Ould

Unit IV. Fiction **40 periods (20 marks)**

The Pearl – John Steinbeck

Unit V. Grammar **20 periods**
(15 marks)

Nouns, Pronouns, Adjectives, Articles

Unit VI. Composition **20 periods**
(15 marks)

Paraphrasing (or) Social Letters: including Friendly Letters and Notes of Invitations (10), Paragraph writing (or) Notice (5)

Recommended book:

1. *Alternative English Class 11*
   Orient Blackswan Private Ltd. H.B Road,
   Mission Compound, Pan Bazar,
   Guwahati – 781001.

2. *The Pearl – John Steinbeck*
   New Longman Literature.

CLASS – 12
ALTERNATIVE ENGLISH

Unit-wise weightage

Time: 3 Hrs. **Marks: 100**

Units		Periods	Marks
I.	Prose	40	20
II.	Poetry	40	20
III.	Fiction	40	20
IV.	Grammar	20	15
V.	Composition	40	25
	Total	**180**	**100**

Unit I. Prose **40 periods**
(20 marks)

i. The Fallacy of Success – G.K. Chesterton
ii. Knowledge and Wisdom – Bertrand Russell
iii. National Prejudices – Oliver Goldsmith
iv. Splendours and Miseries of a Literature Teacher – D.J. Enright
v. I Tremble to think – Robert Lynd

Unit-II. Poetry **40 periods**
(20 marks)

i. The World is Too Much With Us – William Wordsworth
ii. Ode on Solitude – Alexander Pope
iii. Death Be Not Proud – John Donne
iv. The Plate of Gold – Leigh Hunt
v. Endymion - A Thing of Beauty – John Keats

Unit-III. Fiction **40 periods**
(20 marks)

The Mayor of Casterbridge – Thomas Hardy

Unit-IV. Grammar **20 periods**
(15 marks)

Verbs, Tense, Preposition, Errors.

Unit-V. Composition **40 periods**
(25 marks)

i. Essay (10)
ii. Advertisement (5)
iii. Comprehension (10)

Recommended book:

1. *Alternative English Class 11*

Orient Blackswan Private Ltd. H.B Road,
Mission Compound, Pan Bazar,
Guwahati – 781001.

2. *Mayor of Casterbridge (Unabridged) Thomas Hardy.*

CLASS – 11
BENGALI (MIL)

Unit-wise weightage

Time: 3 Hrs. **Marks: 100**

Units		Marks
I.	Prose	35
II.	Poetry	25
III.	Grammar & Translation	20
IV.	Composition	20
	Total	**100**

Unit I : Prose (35 marks)

i.	Biral	-	Bankim Chandra
ii.	Kabuliwala	-	Rabindranath Tagore
iii.	Karma-Yoga Prasange	-	Swami Vivekananda
iv.	Iswar Chandra Vidyasagar	-	Ramendra Sundar Tribedi
v.	Kuthir Maath	-	Bibhutibhusan

Unit II: Poetry (25 marks)

i.	Birahe Tanmayota	-	Vidyapitti
ii.	Atmabilap	-	Madhusundan
iii.	Duranta Asha	-	Rabindranath Tagore
iv.	Vikhari Deb	-	Jatindranath
v.	Abar Asiba Phire	-	Jibanananda

Unit III: Grammar & Translation (20 marks)

i. Karak
ii. Sandhi
iii. Bagdhara
iv. Translation (English to MIL)

Unit IV: Composition (20 marks)

i. Social letters (friendly letters) **(10)**
ii. Speech writing **(10)**

Recommended books:

1. *Bangla Sahitya Beethi – (Assam Book Depot), Panbazar Guwahati.*

2. *Bani Bichitra (Part - II) – Pijush Dey (Bani Prakashani), Guwahati.*

CLASS – 12

BENGALI (MIL)

Unit-wise weightage

Time: 3 Hrs.
Marks: 100

Units		Marks
I.	Prose	30
II.	Poetry	30
III.	Grammar & Translation	20
IV.	Composition	20
	Total	**100**

Unit I : Prose (30 marks)

i.	Russiar Chithi	-	Rabindranath
ii.	Bai Para	-	Pramatha Chowdhury
iii.	Baijnanik Buddhi	-	Raj Sekhar Bosu
iv.	Henry Vivian Dirojio	-	Shilenath Sashtri
v.	Mahesh	-	Sarat Chandra

Unit II.: Poetry (30 marks)

i.	Annadar Atmaparichay	-	Bharat Chandra
ii.	Asha	-	Nabin Chandra
iii.	Bharate Kuthi	-	Premendra Mitra
iv.	Fariad	-	Naznul
v.	Charpatra	-	Sukanta

Unit III: Grammar & Translation (20 marks)

i. Samas
ii. Alankar Prakaran
iii. Bagdhara
iv. Translation (English to MIL)

Unit IV: Composition (20 marks)

i.	Essay writing or Comprehension	(10)
ii.	Advertisement	(5)
iii.	Invitation or Notice	(5)

Recommended books:

1. *Bangla Sahitya Beethi – (Assam Book Depot), Panbazar Guwahati.*
2. *Bani Bichitra (Part - II) – Pijush Dey (Bani Prakashani), Guwahati.*

CLASS - 11

HINDI (MIL)

Unit-wise weightage

Time: 3 Hrs. Marks: 100

Units		**Marks**
I. Prose		35
II. Poetry		25
III. Grammar & Translation		20
IV. Composition		20
Total		**100**

Unit-I Prose (35 marks)

i. Bhola Ram Ka Jeev – Sneer Story – Hari Shankar Parsai
ii. Chief Ki Davat – Story – Bishma Sahani
iii. Ranjani – Short play – Mannu Bhandari
iv. Kutuj - Eassy – Mahaveer Prasad
v. Adhura Milan – Local Folk Tale
vi. Jamun ka per – comedy – Krishna Chandar
vii. Galat Loda – Story – Sarad Joshi

Unit-II Poetry (25 marks)

i. Vani Aur Sakhi – Kabir Das
ii. Ve Akhe – Sumitra Nandan Pant
iii. Chand Aur kavi – Ram Dhari Singh
iv. Jo beet Gayiso Sobat Gayi – Hari Vansh Rai Bachchan
v. Pathik – Ram Naresh Tripathi

Unit-III Grammar & Translation (20 marks)

i. Sandhi
ii. Samas
iii. Paryaywachi Shabda
iv. Muhavare Aur Lokotiya
v. Ras Chahbd & Alankar
vi. Anuwad (English to Hindi)
vii. Correct the sentence, related to noun, pronoun, number, gender, verb, adverb and case.

Unit-IV Composition (20 marks)

i. Social letters (friendly letters) **(10)**
ii. Speech writing **(10)**

Recommended books:

1. *Hindi Gjan Ganga,Nagaland Bhasha Parishad, Kohima.*
2. *Hindi Vjakaran Prakash.*
3. *Saral Hindi Vjakarn – S.K. Pathak & Zakienei Angami. Nagaland Bhasha Parishad, Kohima.*

CLASS – 12
HINDI (MIL)

Unit-wise weightage

Time: 3 Hrs.

Marks: 100

Units		Marks
I. Prose		35
II. Poetry		25
III. Grammar & Translation		20
IV. Composition		20
Total		**100**

Unit-I Prose (35 marks)

i. Poosh Ki Rat – story – Munshi Prem Chand
ii. Trisanku – story – Munnu Bhandari
iii. Bazar Darshan – Nibandh – Janedra Kumar
iv. Angami Kahani – Local Folk Tales
v. Bhaktin – Reminiscences – Mahadevi Varma
vi. Kale Megha Pani De – Traditional Faith – Dharm Veer Bharti
vii. Bahut Bara Sawal – Play – Mohan Rakesh

Unit-II Poetry (25 marks)

i. Dohawali Vinay Patrika – Tulsi Das
ii. Badal Rag – Surya Kant Tripathi
iii. Ghar Ki Yad – Bavani Prasad Mishra
iv. Saharsh Swi Kara Hai Bodh – Gajanand Madhav Mukti
v. Patang – Alok Danwa

Unit-III Grammar & Translation (20 marks)

i. Sandhi
ii. Samas
iii. Paryaywachi Shabd
iv. Muhabare and Lokoktiya
v. Ras, Chahabd & Alankar
vi. Anuwad (English to Hindi)
vii. Correct the sentence, related to noun, pronoun, number, gender, verb, adverb and case.

Unit-IV Composition (20 marks)

i. Essay writing or Comprehension (10)
ii. Advertisement (5)
iii. Invitation or Notice (5)

Recommended books:

1. *Hindi Gyan Ganga, Nagaland Bhasha Parishad, Kohima*
2. *Hindi Vyakaran Prakash.*
3. *Saral Hindi Vyakaran – S.K. Pathak & Zakienei Angami, Nagaland Bhasha Parishad, Kohima*

CLASS – 11

TENYIDIE (MIL)

Unit-wise weightage

Time: 3 Hrs. **Marks: 100**

Units		Marks
I. Prose		35
II. Poetry		25
III. Grammar & Translation		20
IV. Composition		20
Total		**100**

Unit-I Prose (35 marks)

i. Kediu Oedipus
ii. N Keneiu Zotuo
iii. Doctor Faustus
iv. Kediu Lear Dze
v. Sei Mu Zei-ikecü Rhiu
vi. Mha Ketso Seiyakezha Thepfunuoyo

Unit-II Poetry (25 marks)

i. Khe Peziyaluo – L. Dino
ii. Nagamia (1975) – L. Dino
iii. Leshükephrüyo – D. Kuolie
iv. N Ba Nunu N nei Kedalie – Medo
v. Rheichie Khrüprei – Medo
vi. Tsiedo Kelhou – Tshunilie
vii. Themia Kelhou – Vilakiehu
viii. A Kelhou Nu – K. Neihu Gwirie

Unit-III Grammar & Translation (20 marks)

i. Grammar
ii. Translation

Unit-IV Composition (20 marks)

i. Social letters (friendly letters) **(10)**
ii. Speech writing **(10)**

Recommended books:

1. *Kelhou Dzevi – D. Kuolie- Ura Academy Publication, Kohima*
2. *Grammar: Diekhu mu Dierozu (Revised Edition 2006) – Shürhozelie, Ura Academy Publication, Kohima.*

CLASS – 12
TENYIDIE (MIL)

Unit-wise weightage

Time: 3 Hrs.
Marks: 100

Units		Marks
I. Prose		35
II. Poetry		25
III. Grammar & Translation		20
IV. Composition		20
Total		**100**

Unit-I Prose (35 marks)

i. Dzukepelhei Kevor
ii. Jakob Nuonuo Thepfu Kerekenieko
iii. Mosa Mu Aron Unie Ijipt Nunu Israelko Ze Kepar
iv. Esther Kedipfü Dze
v. Daniel Mu Puo Zeko Dze
vi. Solomon Dze
vii. Jona Dze
viii. U Kelhouzho

Unit-II Poetry (25 marks)

i. Khrieu – Ura Academy
ii. Sopfünuo – Ura Academy
iii. Lhou Si Mota Athiediu Chü – L.V. Mezhüvilie
iv. Tenyimia – L. Dino
v. Keviu U Ya – Vilakiehu
vi. Kedietho Mu Kekhrie – Lhouvio
vii. Kekhriesi – M. Meguo-o
viii. Leshükephrü – M. Meguo-o

Unit-III Grammar & Translation (20 marks)

i. Grammar
ii. Translation

Unit-IV Composition (20 marks)

i. Essay writing or Comprehension (10)
ii. Advertisement (5)
iii. Invitation or Notice (5)

Recommended books:

1. *Si Kezhü Dze – Rüzhükhrie Sekhose – Ura Academy Publication, Kohima.*
2. *Üca-53 - – Shürhozelie, Ura Academy Publication, Kohima.*
3. *Tenyimia Mhaphruo Geizoko – D. Kuolie, Ura Academy Publication, Kohima.*
4. *Tenyimia Dze (Thuthe-5&6) - – Shürhozelie, Ura Academy Publication, Kohima.*
5. *Grammar: Diekhu mu Dierozu (Revised Edition 2003 – Shürhozelie, Ura Academy Publication, Kohima.*

CLASS – 11
LOTHA (MIL)

Unit-wise weightage

Time: 3 Hrs. **Marks:**

100

Units			Marks
I. Prose			35
II. Poetry			25
III.	Grammar & Translation		20
IV.	Composition		20
Total			**100**

Unit-I Prose (35 marks)

i. Hümchipili motsü
ii. Kakoejüp motsü
iii. Nri nchyua tona potsow loroe nchyua to motsü
iv. Mali loroe motsü
v. Kyongyi erannto lo tsükaranka
vi. Zitungziri lo ozen
vii. Elijah tona Baal zenkhying jiang to

Unit-II Poetry (25 marks)

i. Vantan Raza
ii. Sukhying sosi tsata
iii. Zükhümki yan pyoncho
iv. Shanti woe miphong
v. Elhi lo lum theta

Unit-III Grammar & Translation (20 marks)

i. Grammar
ii. Translation

Unit-IV Composition (20 marks)

i. Social letters (friendly letters) **(10)**
ii. Speech writing **(10)**

Recommended books:

1. *Kyong Ekhao Ekhürhycho 12 & 11 by Kyong Academy.*
2. *Kyong Chungiyi by Kyong Academy.*
3. *Kyong yinsanlan (Kyong Grammar) – By:- K.R. Murry.*
4. *Outline Grammar of the Lotha Naga Language: Rev. Dr. W.E Witter*

CLASS – 12
LOTHA (MIL)

Unit-wise weightage
Time: 3 Hrs

Marks: 100

Units	Marks
I. Prose	35
II. Poetry	25

100

Unit-I Prose (35 marks)

i. Zenkha ji na kvütoilyai ete eküm jiang tongphia la?
ii. Ruth motsü
iii. Shita ethe
iv. Lüm etsson jo mtio la?
v. Sir Ronald Ross
vi. Limha ji ngkanphio kyakori
vii. Donphen emyumü ji cheka ji

Unit-II Poetry (25 marks)

i. Sükhying ngazo soa rocho
ii. Emungyanti Nagaland
iii. Janchoünzoe
iv. Naga liphong yanchecho
v. Yihata etssoji li etho

Unit-III Grammar & Translation (20 marks)

i. Grammar
ii. Translation

Unit-IV Composition (20 marks)

i. Essay writing or Comprehension (10)
ii. Advertisement (5)
iii. Invitation or Notice (5)

Recommended books:

1. *Kyongyi Ekhao Ekhürhyucho 12 & 11 by Kyong Academy.*
2. *Kyong Chungiyi by Kyong Academy.*
3. *Kyongyi Nsanlan (Kyong Grammar) by K.R. Murry .*
4. *Outline Grammar of the Lotha Naga Language: by Rev. Dr.W.E. Witter*

CLASS – 11
AO (MIL)

Unit-wise weightage
Time: 3 Hrs. Marks: 100

Units	Marks
I. Prose (Otsü)	35
II. Poetry (Sangro)	25
III. Grammar & Translation (Orrlem)	20
IV. Composition (Olem)	20
Total	**100**

Unit-I Prose (35 marks)

i. Pentochepchep Ritsüng Chapter 1 to 13 15 marks
ii. Aor Lotki Puti Rajem, Tebhong Ana Shilem 1, tesayuba 1 nungi 8 tashi (tapak 1-41 tashi)

20 marks

Unit-II Poetry (Sangro) (25 marks)

i. Kü Lima Nungtem – W. Chubanungba
ii. Miim Nüktzü – T. Senka
iii. Kin Meimsang – Tali Longkümer
iv. Takar Ka Mangzür – I. Aküm Kichu
v. Süngpuungerkong Penzü – I. Temjen Tzüdir

Unit-III Grammar & Translation (Orrlem) (20 marks)

i. Mapanglem, Mungra, Lamalen, Apakijem
ii. O Meyipzük (Translation)

Unit-IV Composition (Olem) (20 marks)

i. Social letters (friendly letters) **(10)**
ii. Speech writing **(10)**

Recommended books:

1. *M.L. Wati Jamir Zülu (Letter Writing) ORRLEM ASSER OLEM, ASLB Publication 2007.*
2. *A. Lanunungsang, AOR LOKTI PUTI RAJEM, tebhong ana shilem II, ASLB Publication 2007.*
3. *AKUMLIR MUNGSONG TEBHONG ANA (VOL.II) ASLB 2008.*
4. *W. Chubanungba, PENTOCHEPCHEP RITSÜNG, ASLB revised edition 2008.*

CLASS – 12
AO (MIL)

Unit-wise weightage
Time: 3 Hrs
Marks: 100

Units	Marks
I. Prose (Otsü)	35
II. Poetry (Sangro)	25
III. Grammar & Translation (Orrlem)	20
IV. Composition (Olem)	20
Total	**100**

Unit-I Prose (35

marks)

1. Akümlir Mungsong Tebhong Ana (Vol. II ASLB)

20 marks

i. Takümotsü – Jepdakyangla, A. Lanunungsang
ii. Tarnunger otsü – A. Lanunungsang
iii. Sangremer Pungmang – T. Senka
iv. Shikiraki – I. Temjen Tzüdir
v. Talenba – T. Senka

2. Aor Lotki Puti Rajem, Tebhong ana

15 marks

Shilem II, tesayuba 9 nungi 15 tashi (tapak 42-76 tashi)

Unit-II Poetry (Sangro) (25 marks)

i. Longtrok – T. Nokpang
ii. Chitentsür Pezü – I. Aküm Kichu
i. Takar Aser Tsüktem Moluk – I. Temjen Jamir
ii. Kinu Lima – T. Senka
iii. Mongpu Enjeter Ana – Tali Longkümer
iv. Nokinketer Ajakbo Meshilang – I. Temjen Tzüdir

Unit-III Grammar & Translation (Orrlem) (20 marks)

i. Rasem Aser Ralok, Timsü aser Rapasü Amshiyim, Apakijem
ii. O Meyipzük (Translation)

Unit-IV Composition (Olem) (20 marks)

i. Essay writing or Comprehension (10)
ii. Advertisement (5)
iii. Invitation or Notice (5)

Recommended tbooks:

1. *M.L. Wati Jamir Zülu (Letter Writing) ORRLEM ASSER OLEM, ASLB Publication 2007.*
2. *A.Lanunungsang, AOR LOKTI PUTI RAJEM, tebhong ana shilem II, ASLB Publication 2007.*
3. *AKUMLIR MUNGSONG TEBHONG ANA (VOL.II) ASLB 2008.*

CLASS – 11
SUMI (MIL)

Unit-wise weightage

Time: 3 Hrs. Marks: 100

Units	Marks
I. Prose	35
II. Poetry	25
III. Grammar & Translation	20
IV. Composition	20
Total	**100**

Unit-I Prose (35 marks)

i. Nagami Phuthekuwo
ii. Nagami Yeghi Lo Khristo Yehkulu
iii. Amüghüssü
iv. Khakhu Eno Sheyili
v. Külakupu
vi. Avito Kiba
vii. Indira Gandhi

Unit-II Poetry (25 marks)

i. Ghonili Eno Inakha
ii. Atsünagha Kippe
iii. Khumtsa Amighiu Leshe
iv. Ajoji Küghakulu Leshe
v. Vesükulho Leshe

Unit-III Grammar & Translation (Tsayeh Eno Pekibide) (20 marks)

i. Ado (Tense)
ii. Atsajo Kikije (Parsing)
iii. Pekibide (Translation)

Unit-IV Composition (20 marks)

i. Social letters (friendly letters) **(10)**
ii. Speech writing **(10)**

Recommended books:

1. *Küghakiche Eno Xülhe by I. Lozhevi Sema*
2. *Apuh-Assü Leshe compiled by S.V.Sheyepu*
3. *Sümi Tsayeh (Grammar) by I. Lozhevi Sema*

CLASS – 12
SUMI (MIL)

Unit-wise weightage

Time: 3 Hrs

Marks: 100

Units	Marks
I. Prose	35
II. Poetry	25
III. Grammar & Translation	20
IV. Composition	20
Total	**100**

Unit-I Prose (35 marks)

i. Timi Küdüu
ii. Joymati Eno Godadhar

iii. Achineh
iv. General Kaito
v. Kalalishi
vi. Iphreni Nuliqo
vii. Akhuayeh Kivi

Unit-II Poetry (25 marks)

i. Satakha nu Ghüshe
ii. Anipu Shikipili
iii. Amllo Kighishi
iv. Kiyeshe Theh Eno Pa Kithi
v. Asüh Akke Lo Axamunu Kuppu

Unit-III Grammar & Translation (Tsayeh Eno Pekibide) (20 marks)

i. Thizungo (Preposition)
ii. Sulekutho (Idioms and Phrases)
iii. Shikumzu (Corrections of Errors)
iv. Translation

Unit-IV Compositions (20 marks)

i.	Essay writing or Comprehension	(10)
ii.	Advertisement	(5)
iii.	Invitation or Notice	(5)

Recommended books:

1. *Küghakiche Eno Xülhe by I. Lozhevi Sema*
2. *Apuh-Assü Leshe compiled by S.V.Sheyepu*
3. *Sümi Tsayeh (Grammar) by I. Lozhevi Sema*

POLITICAL SCIENCE

Rationale

At the higher secondary level, students who opt Political Science are given an opportunity to get introduced to the diverse concerns of a Political Scientist. At this level, there is a need to enable students to engage with political processes that surround them and provide them with an understanding of the historical context that has shaped the present. The different courses introduce the students to the various streams of the discipline of Political Science: political theory, Indian politics and international politics. Concerns of the other two streams – comparative politics and public administration are accommodated at different places in these courses. In introducing these streams, special care has been taken not to burden the students with the current jargon of the discipline. The basic idea here is to lay the foundations for a serious engagement with the discipline at the undergraduate stage.

Objectives:

INDIAN CONSTITUTION AT WORK

1 Enable students to understand historical processes and circumstances in which the Constitution was drafted.

2 Provide opportunity for students to be familiar with the diverse visions that guided the makers of the Indian Constitution.

3 Enable students to identify the certain key features of the Constitution and compare these to other constitutions in the world.

4 Analyse the ways in which the provisions of the Constitution have worked in real political life.

POLITICAL THEORY

1 Develop the skills for logical reasoning and abstraction.

2 Inculcate attention to and respect for viewpoints other than one's own.

3 Introduce students to the different political thinkers in relation to a concept and in everyday social life.

4 Encourage the students to analyse any unexamined prejudices that one may have inherited.

5 Enable students to meaningfully participate in a concern of current political life that surrounds them.

POLITICS IN INDIA AFTER INDEPENDENCE

1 Enable students to be familiar with some of the key political events and figures in the post-independence period.

2 Develop skills of political analysis through events and processes of recent history.

3 Develop their capacity to link macro processes with micro situations and their own life.

4 Encourage the students to take a historical perspective of making sense of the contemporary India.

CONTEMPORARY WORLD POLITICS

1 Enable the students to expand their horizon beyond India and make sense of the political map of contemporary world.

2 Familiarise the students with some of the key political events and processes in the post cold war era.

3 Equip students to be conscious of the way in which global events and processes shape our everyday lives.

4 Strengthen their capacity for political analysis by thinking of contemporary developments in historic perspective.

CLASS – 11
POLITICAL SCIENCE

Unit-wise weightage
Time: 3 Hrs. **Marks: 100**

Units	Periods	Marks
Part A: Indian Constitution at Work		
· c perspective.**CLASS – 11 POLIT**		· h
CIENCE Unit-wise weightage Time: 3 Hrs.		· ih
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4. Executive in a parliamentary system
5. Legislature at the central and state level } 23 14

6. Judiciary
7. Federalism } 18 10

8. Local Government
9. Constitution as a living document } 18 10

Part B: Political Theory

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: Political Theory

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5 Constitutional means to prevent defection.

6. Judiciary: 18 periods (10 marks)

1 Rule of law.
2 Independence of Judiciary
3 Appointment and removal of Judges.
4 Powers of the Supreme Court and High Courts and use of their jurisdiction for public interest.

7. Federalism:

1 Meaning and features.
2 Federalism and accommodation of diversities.
3 Special provisions for some states and areas.

8. Local Government: 18 periods (10 marks)

1 Decentralisation of power.
2 Status of local government in the constitution.
3 Basic features of rural and urban local government.
4 Effects of giving constitutional status to local government.

9. Constitution as a living document:

5 Constitutional changes since its inception.
6 Amendment procedure of the constitution.
7 Effects of the constitution on the working of the democracy.

Part - B: POLITICAL THEORY

10. Introduction to Political Theory: 9 periods (5 marks)

1 Meaning of politics.
2 Politics in seemingly non-political domains.
3 Resolving political arguments through reasoning.
4 Importance of political theory.

11. Liberty: 27 periods (15 marks)

1 Meaning and types.
2 Reasonable constraints and limits on individual liberty.

12. Equality:

1 Meaning and types.
2 Major forms of inequality.
3 Means to realize equality.

13. Social Justice:

1 Meaning.
2 Relationship between justice and equality.
3 Different forms of injustice.

4 Ways to secure justice.

14. Rights: 23 periods (14 marks)

1 Meaning and major kinds of rights.
2 Rights and claims.
3 Resolving conflicts between individual and community rights.
4 Role of state in enabling and obstructing rights.

15. Citizenship:

1 Meaning.
2 Acquisition and loss of citizenship.
3 Global citizenship.

16. Nationalism: 31 periods (16 marks)

1 Meaning.
2 Nation and state.
3 Demands of a nation on its citizens.
4 Basis of the right to self-determination.

17. Secularism:

1 Meaning.
2 The need of secularism in modern India.

18. Peace and Development:

1 Meaning.
2 Peace and non-violence.
3 Armament and global peace.
4 Relationship between peace and development.

Recommended book:

Political Science
by Avnindra Kumar Verma,
V.K. (India) 4323/3, Ansari Road,
Darya Ganj, New Delhi – 110002.

CLASS - 12

POLITICAL SCIENCE

Unit-wise weightage

Time: 3 Hrs.
Marks: 100

Units	Periods	Marks
Part A: Indian Polity		
1. Party System 2. Era of One-Party Dominance	23	13
3. Nation-Building and its Problems 4. Politics of Planned Development	23	12
5. India's External Relations 6. Crisis of the Constitutional Order	24	13
7. Interest and Pressure Groups	10	6
8. Democratic Upsurge, Coalition Politics and Challenges	10	6
Part B: Contemporary World Politics		
9. Cold War Era in World Politics	14	8
10. Disintegration of the 'Second World' and the Collapse of Bipolarity. 11. US Dominance in World Politics	24	13
12. Alternative Centres of Economic and Political Power 13. South Asia in the Post-Cold War Era	20	11
14. International Organisations in a Unipolar World 15. Security in Contemporary World	22	12
16. Globalisation and its Critics	10	6
Total	**180**	**100**

Part A: Indian Polity

1. Party System: **23 periods (13 marks)**

3. Nation-Building and its Problems: 23 periods (12 marks)

2 Legacy of partition: challenges of refugee resettlement, the Kashmir problem.
3 Organisation and reorganisation of states.
4 Political conflicts over language.

4. Politics of Planned Development:

1 Five Year Plans.
2 Expansion of state sector and the rise of new economic interest.
3 Famine and suspension of Five Year Plans.
4 Green Revolution and its political fallouts.

5. India's External Relations: 24 periods (13 marks)

1 Nerhu's foreign policy.
2 Sino-Indian War of 1962, Indo-Pakistan War of 1965 and 1971.
3 India's nuclear programme and shifting alliances in world politics.

6. Crisis of the Constitutional Order:

1 Search for committed bureaucracy and judiciary.
2 Navnirman movement in Gujarat and the Bihar movement.
3 Emergency: context, constitutional and extra-constitutional dimensions, resistance to emergency.
4 Rise of civil liberties organisations.

7. Interest and Pressure Groups: 10 periods (6 marks)

1 Meaning and role.
2 Implementation of Mandal Commission Report and its aftermath.

8. Democratic Upsurge, Coalition Politics and Challenges: 10 periods (6 marks)

1 Participatory upsurge in 1990s.
2 Increasing role of regional parties and coalition politics.
3 UF, NDA and UPA Governments.
4 Challenge of communalism.

Part B: Contemporary World Politics

9. Cold War Era in World Politics: 14 periods (8 marks)

1 Emergence of two power blocs after the Second World War.
2 Arenas of Cold War.
3 Challenges to Bipolarity: Non Aligned Movement, quest for New International Economic Order.

10. Disintegration of the 'Second World' and the Collapse of Bipolarity: 24 periods (13 marks)

4 New entities in world politics: Russia, Balkan States and Central Asian States.
5 Introduction of democratic politics and capitalism in post-communist regimes.

11. US Dominance in World Politics:

1 Growth of unilateralism: Afghanistan, First Gulf War, response to 9/11 and attack on Iraq.

2 Dominance and challenge to the US in economy and ideology.

12. Alternative Centres of Economic and Political Power: 20 periods (11 marks)

1 Rise of China as an economic power in post-Mao era.

2 Creation and expansion of European Union.

3 ASEAN.

13. South Asia in the Post Cold War Era:

1 Democratisation and its reversals in Pakistan and Nepal.

2 Ethnic conflict in Sri Lanka.

3 Impact of economic globalization on the region.

4 Conflicts and efforts for peace in South Asia.

14. International Organisations in a Unipolar World: 22 periods (12 marks)

1 Restructuring and the future of the UN.

2 Rise of new international actors: new international economic organisations, NGOs.

3 Democratic and accountability as the new institutions of global governance.

15. Security in Contemporary World:

1 Traditional concerns of security and politics of disarmament.

2 Non-traditional or human security: global poverty, health and education.

16. Globalisation and its Critics: 10 periods (6 marks)

1 Economic, cultural and political manifestations.

2 Debates on the nature of the consequences of globalisation.

3 Anti-globalisation movements.

Recommended book:

Political Science
by Avnindra Kumar Verma,V.K. (India) 4323/3,
Ansari Road,Darya Ganj, New Delhi – 110002.

HISTORY

Objectives:

1 Effort in these senior secondary classes would be to emphasize to students that history is a critical discipline, a process of enquiry, a way of knowing about the past, rather than just a collection of facts.

2 The syllabus would also enable students to relate/compare developments in different situations, analyze connection between similar processes located in different time periods, and discover the relationship between different methods of social enquiry within different Social Sciences.

3 The objective of this history course is to help develop an understanding of the importance of historical perspective in the study of modern issues and problems.

4 The syllabus in Class – 11 is organized around some major themes in world history. Through the study of these themes students will acquire a sense of the wider historical processes as well as an idea of the specific debates around them.

5 In Class-12 the focus will shift to a detailed study of some themes in ancient, Medieval and Modern Indian history. The object would be to study a set of these themes in some detail and depth rather than survey the entire chronological span of Indian History. Some themes in Class 12 will introduce the student to one type of source for the study of history.

6 While the themes in both these Classes (11 and 12) are arranged in a broad chronological sequence there are overlaps between them. This is intended to convey a sense that chronological divides and periodization do not always operate in a neat fashion.

CLASS – 11
HISTORY

Unit-wise weightage

Time: 3 Hrs. **Marks: 100**

Units	Periods	Marks
Section A: Early Societies:	**35**	20
1. From the beginning of time	19	
2. Early Cities	16	
Section B: Empires	**45**	25
3. An empire across three continents	17	
4. Central Islamic lands	15	
5. Nomadic empires	13	
Section C: Changing Traditions	**45**	25
6. Three orders	14	
7. Changing cultural traditions	17	
8. Confrontation of cultures	14	

Class – 11
Themes in World History

Themes

Section A : Early Societies

1. From the Beginning of Time
   Focus: Africa, Europe till 15000 B.C.
   (a) Views on the origin of human beings
   (b) Early Societies
   (c) Different views on present day hunting gathering societies.
2. Early cities
   Focus: Iraq, 3rd millennium B.C.
   (a) Growth of towns
   (b) Nature of early urban societies
   (c) Debate on uses of writing

Section B : Empires

3. An empire across three continents
   Focus: Roman Empire, 27 B.C. to 600 A.D.
   (a) Political evolution
   (b) Economic expansion
   (c) Society
   (d) Religion
   (e) Late antiquity
   (f) Different views on the institution of slavery
4. Central Islamic Lands
   Focus: 7th to 12th Centuries
   (a) Polity
   (b) Economy
   (c) Culture
   (d) Different viewpoints on the nature of the crusades
5. Nomadic Empires
   Focus:The Mongol, 13th to 14th Century
   (a) The nature of nomadism
   (b) Formation of Nomadic empires
   (c) Conquests and relations with other states
   (d) Different views on nomadic societies and state formation

Section C: Changing Traditions

6. Three orders
   Focus: Western Europe, 13th – 16th Century
   (a) Feudal society and Economy

Section B: Medieval India	**55**	30
5. Religious Histories: The Bhakti-Sufi tradition.	12	
6. The Mughal court: Reconstructing Histories through Chronicles (Akbarnama and Padshahnama)	16	
7. Agrarian Relations: The Ain-i-Akbari		
8. Medieval Society through Travellers' Accounts: Alberuni, Ibn Batuta, Bernier.	15	
	12	
Section C : Modern India	**60**	35
9. Colonialism and Rural Society	13	
10. Representations of 1857	12	
11. Mahatma Gandhi and Indian National Movement: 1918-1947	20	
12. Independence and the Making of the Constitution.	15	
13. Map work on units 1-12		
	10	5
Total	**180**	**100**

Class - 12
Themes in Indian History

Themes

Section A : Archaeology and Ancient India

1. The story of the first cities: Harappan Archaeology.
   Broad overview: - Early Urban Centres-Harappan Civilization, phase, extent, Town Planning, Buildings, Drainage, Great Bath, Granaries, Trade and Commerce, Industries, Funerary customs, dress and Ornaments.
   Discussion : how it has been utilised by archaeologists/historians.

2. A History of early Religions.

   Broad overview: A brief review of religious histories of Vedic religion, Jainism, Buddhism, Vaishnavism and Saivism.
   Discussion- ways in which sculpture has been interpreted by historians, other sources for reconstructing the history of Buddhism.

3. Social Histories: Using the Mahabharata.
   Board overview: Issues in social history including caste, class, kinship and gender.
   Discussion - other sources for reconstructing social history.

children's own experience becomes essential. While doing so, it is to observe and understand the economic realities. Bringing in economics as an abstract knowledge at the early stages of school education would promote rote methods of learning the subject.

At higher secondary stage, the learners are in a position to understand abstract ideas, exercise the power of thinking and to develop their own perception. It is at this stage, the learners are exposed to the rigour of the discipline of economics in a systematic way.

The economics courses are introduced in such a way that in the initial stage, the learners are introduced to the economic realities that the nation is facing today along with some basic statistical tools to understand these broader economic realities. In the later stage, the learners are introduced to economics as a theory of abstraction.

The economics courses also contain many projects and activities. These will provide opportunities for the learner to explore various economic issues both from their day-to-day life and also from issues, which are broader and invisible in nature. The academic skills that they learn in these courses would help to develop the projects and activities. The syllabus is also expected to provide opportunities to use information and communication technologies to facilitate their learning process.

OBJECTIVES

1 Understanding of some basic economic concepts and develop economic reasoning which the learners can apply in their day-to-day life as citizens, workers and consumers.
2 Realisation of learner's role in nation building and sensitise them to the economic issues that the nation is facing today.
3 To equip with basic tools of economics and statistics to analyse economic issues. This is pertinent for even those who may not pursue this course beyond higher secondary stage.
4 To develop an understanding that there can be more than one view on any economic issue and to develop the skills to argue logically with reasoning.

CLASS - 11
ECONOMICS

Unit-wise weightage
Time: 3 Hrs. **Marks: 100**

Units		Periods	Marks
PART A :	**STATISTICS FOR ECONOMICS**		
1.	Introduction	7	5
2.	Collection, Organisation and presentation of data	28	15
3.	Statistical Tools and Interpretation	45	25
4.	Developing projects in Economics	10	5

PART B : INDIAN ECONOMIC DEVELOPMENT

5. Development Policies and Experience (1947-90)	18	10
6. Economic Reforms since 1991	14	8
7. Current challenges facing Indian Economy	46	25
8. Development experience of India – A comparision with neighbours.	12	7
Total	**90**	**50**

PART A : STATISTICS FOR ECONOMICS

Unit 1 : Introduction **7 Periods**

(5 marks)

a. What is Economics.
b. Meaning, scope and importance of statistics, relationship between statistics and economics.

Unit 2 : Collection, Organisation and Presentation of data.

28 Periods (15 marks)

a. **Collection of data** –sources of data- primary and secondary data methods of collection of primary and secondary data: Census of India and National Sample Survey Organisation.
b. **Organisation of Data** :Meaning and types of variables; Frequency Distribution Table.
c. **Presentation of Data**: Presentation and Diagrammatic Presentation of data
   (i) Geometric forms (simple, multiple, sub-divided, percentage bar diagrams and pie diagram).
   (ii) Graphic forms (histogram, polygon, curve and ogive) (use graph papers).

Unit 3 : Statistical Tools and Interpretation. **45 periods**

(25 marks)

a. **Measures of Central Tendency** - mean, median and mode.
b. **Measures of Dispersion** – absolute dispersion (range, quartiles, quartile deviation, mean deviation and standard deviation), relative dispersion (co-efficient of range, coefficient of quartile deviation, coefficient of mean deviation and coefficient of standard deviation).
c. **Correlation** : meaning, significance and types.
d. **Index numbers** : meaning, significance and types.

Unit 4 : Developing Projects in Economics . **10 periods**

(5 marks)

The students may be encouraged to develop projects, which have primary data, secondary data or both. Students will have to prepare any one of the following projects and have to be submitted at the time of examination along with the answer scripts.

(i) A report on demographic structure of your neighbourhood.
(ii) Consumer awareness amongst households.
(iii) Changing prices of a few commodities in your market.

PART B : INDIAN ECONOMIC DEVELOPMENT

Unit 5 : Development Policies and Experience (1947-90). 18 periods
(10 marks)

a. The State of Indian Economy on the eve of independence.
b. Main objectives of five-year plans.
c. Main features, problems and suggestive measures to improve agriculture.
d. Industrial Policy 1991.
e. Meaning and importance of foreign trade.

Unit 6 : Economic Reforms since 1991. **14 periods**

(8 marks)

a. Need and main features – liberalisation, globalisation and privatisation.
b. An appraisal of LPG policies.

Unit 7 : Current challenges facing Indian Economy. 46 periods

(25 marks)

a. **Poverty:-** absolute and relative; main programmes for poverty alleviation.
b. **Rural Development: -** problems; suggestive measures – credit and marketing; role of cooperatives.
c. **Human Capital Formation :-** Role of human capital in economic development; Growth of Education Sector in India.
d. **Employment: -** Growth, problems, suggestive measures and policies.
e. **Infrastructure:**- Meaning and Types:- Energy and Health : Problems and Policies.
f. **Environment:-** Sustainable Economic Development, effects of economic development on resources and environment.

Unit 8 : Development Experience of India: **12 periods**

(7 marks)

A comparison with neighbours

a. India and Pakistan.
b. India and China.
c. Issues: growth, population, sectoral development and other developmental indicators.

Recommended book:

Economics for class 11
By S.K. Agarwala
Goyal Brothers Prakashan,
F-75, Green Park Main,
New Delhi – 110016.

CLASS - 12
ECONOMICS

Unit-wise weightage
Time 3 Hrs.

Marks 100

Units	Periods	Marks
PART A : INTRODUCTORY MICROECONOMICS		
1. Introduction	10	4
2. Consumer Behaviour and Demand	25	13
3. Producer Behaviour and Supply	35	23
4. Forms of Market and Price Determination	20	10
Total	**90**	**50**
PART B : INTRODUCTORY MACROECONOMICS		
5. National Income and Related Aggregates	28	15
6. Determination of Income and Employment	22	12
7. Money and Banking	16	8
8. Government Budget and the Economy	14	8
9. Balance of Payments	10	7
Total	**90**	**50**

PART A : INTRODUCTORY MICROECONOMICS.

Unit 1 : Introduction. **10 periods (4 marks)**

What is Microeconomics

a. Consumer's Equilibrium – meaning and attainment of equilibrium through utility approach : one commodity case.
b. Demand, market demand, determinants of demand, demand schedule, demand curve, movement along and shifts in demand curve, price elasticity of demand, measurement of price elasticity of demand – percentage, total expenditure and geometric methods.

Unit 3 : Producer Behaviour and supply. 35 periods

(23 marks)

a. Production function: returns to factor and returns to scale.
b. Supply, market supply, determinants of supply, supply schedule, supply curve, movement along and shifts in supply curve, price elasticity of supply, measurement of price elasticity of supply – percentage method.
c. Cost and Revenue : Concepts of costs-short-run cost curves (fixed, variable, total, average and marginal costs); concepts of revenue – total, average and marginal revenue and their relationships.
d. Producer's equilibrium – with the help of MC and MR.

Unit 4 : Forms of Market and Price determination. 20 periods
(10 marks)

a. Forms of Market – perfect competition, monopoly, monopolistic competition - their meaning and features.
b. Price determination under perfect competition – Equilibrium price, effects of shifts in demand and supply.

PART B: INTRODUCTORY MACROECONOMICS

Unit 5 : National Income and related aggregates. 28 periods
(15 marks)

a. Macroeconomics : Meaning
b. Circular flow of income, concepts of GDP, GNP, NDP, NNP (at market price and factor cost), National Disposable Income, Private Income, Personal Income and Personal Disposable Income
c. Measurement of National Income – Value added method, Income method and Expenditure method.

Unit 6 : Determination of income and Employment. 22 periods
(12 marks)

a. Classical theory of income and employment (Say's law of market)
b. Aggregate demand, aggregate supply and their components.
c. Propensity to consume and Propensity to save (average and marginal)
d. Meaning of involuntary unemployment and full employment.
e. Determination of income and employment.
f. Concept of investment multiplier and its working.
g. Problems of excess and deficient demand.
h. Measures to correct excess and deficient demand.

Unit 7 : Money and Banking. 16 periods
(8 marks)

c. Money:- meaning and functions
b. Central Bank – meaning and functions

c. Commercial Banks - meaning and functions.

Unit 8 : Government Budget and the Economy. 14 periods (8 marks)

a. Government budget – meaning, components and objectives of government budget.
b. Classification of receipts – revenue and capital, classification of expenditure – revenue and capital, plan and non plan and developmental and non-developmental.
c. Balanced budget, surplus budget and deficit budget : meaning and implications. Revenue deficit, fiscal deficit and primary deficit : meaning and implications.

Unit 9 : Balance of Payments. 10 periods (7 marks)

a. Meaning – Balance of Trade, Balance of Payments, Foreign exchange rate.
b. Components of Balance of Payments.

Recommended book:

Economics for class 12
by S.K Agarwala Goyal Brothers Prakashan,
F – 75 Green Park main, New Delhi – 110016.

PSYCHOLOGY

Objectives:

1 To develop appreciation about human behaviour and human mind in the context of learners' immediate society and environment.
2 To develop in learners an appreciation of multidisciplinary nature of psychological knowledge and its application in various aspects of life.
3 To enable learners to become perceptive, socially aware and self-reflective.
4 To facilitate students' quest for personal growth and effectiveness, and to enable them to become responsive and responsible citizens.
5 To teach the techniques of adjustment while facing life problems.
6 To familiarize them with the collection of data and to give some practical training in graphical representation.

CLASS - 11
PSYCHOLOGY (Theory)

Unit-wise weightage

Theory Paper Time: 3 Hrs. Marks: 90

Units	Periods	Marks
I. Introduction to Psychology	12	10
II. Methods of enquiry in Psychology	20	12
III. Knowing Process	8	5
IV. Basic needs and their satisfaction	8	5
V. Environmental and Behaviour	16	8
VI. Life span development	20	12
VII. Learning	20	10
VIII. Attention and Interest	16	8

(10 marks)

Meaning of Psychology; Popular notions about discipline of psychology; understanding mind and behaviour; evolution of psychology; branches of psychology; themes of research and applications; psychology and other disciplines; psychologists at work; psychology in everyday life; development of psychology in India.

Unit II: Methods of enquiry in Psychology 20 periods
(12 marks)

Observation; experiment ; case study; cross sectional method; longitudinal method; differential method; clinical method; questionnaires; interviews; ethical issues involved in Psychological studies.

Unit III: Knowing Process 8 periods
(5 marks)

Knowing the world; nature and varieties of stimulus; sense modalities; adaptation; perceptual processes; perceiver; principles of perceptual organisation; perceptual constancies; illusions; socio-cultural influences on perception; conceptual processes; meaning and nature of concepts.

Unit IV: Basic needs and their satisfaction 8 periods
(5 marks)

Biological needs and their satisfaction; emotional needs and their satisfaction; social needs and their satisfaction; Intellectual needs and their satisfaction.

Unit V: Environmental and Behaviour 16 periods
(8 marks)

Man-Environmental relationship; environmental stress and their effects; noise; pollution; crowding; natural disasters; promoting pro-environmental behaviour.

Unit VI: Life span development 20 periods
(12 marks)

Meaning of growth and development; Principles of development; factors influencing development; stages of development-infancy; childhood; adolescence.

Unit VII: Learning 20 periods
(10 marks)

Meaning and nature; process of learning; law of learning-law of readiness; law of effects; law of exercises. Methods of learning-Trial and Error; Conditioning; Imitation and Insightful method; Transfer of learning; factors influencing learning-physiological; psychological and environmental.

Unit VIII: Attention and Interest 16 periods
(8 marks)

Meaning and nature of attention; factors arousing attention-external,

internal; meaning and characteristics of interest.

Unit IX: Habits 12 periods (5 marks)

Meaning and nature of habits; formation of habits; breaking of bad habits.

Unit X: Psychology and Education 20 periods (10 marks)

Meaning and concepts of education; definition stressing on inner potentiality; narrower and broader meaning of education; aims of education.

Unit XI: Heredity and Environment 8 periods (5 marks)

Heredity school of opinion; what is environment? Relative importance of heredity and environment.

CLASS – 11
PSYCHOLOGY (Project) Marks: 10

Projects, experiments, small studies, etc. 20 periods (10 marks)

The students shall be required to undertake one project. The project would involve the use of different methods of enquiry and related skills, related to the topics covered in the course.

a) Reporting file including project work **7 marks**
b) Viva-voce **3 marks**

NOTE: No question paper for project work will be set by the Board.

Recommended books:

1. *Introduction to Psychology Part I & II. NCERT.*

2. *Introduction to Psychology.*
   by C.T. Morgan and R.A. King
   Mc Graw Hill Book Company.

3. *Educational Psychology.*
   by S.K. Mangal , Tandon Publications

CLASS – 12
PSYCHOLOGY

Unit-wise weightage
Time: 3 Hrs.
Marks: 90

Units		Periods	Marks
I.	Intelligence	20	10
II.	Memory and forgetting	20	10
III.	Self and Personality	18	10
IV.	Biological bases of behaviour	13	6
V.	Coping with life challenges	13	7
VI.	Psychological disorders	16	8
VII.	Therapeutic approaches	16	8
VIII.	Language and communication	10	5
IX.	Psychology and social problems	16	8
X.	Social Influence and Group Processes	16	8
XI.	Statistics in Psychology	22	10
	Total	**180**	**90**

Unit I : Intelligence **20 periods**
(10 marks)

Meaning of intelligence: Contemporary approaches to understanding intelligence. Theories of intelligence- monarchic theory, anarchic theory, Spearman's two factor theory, group factor theory, concept of IQ, measurement of intelligence, classification of intelligence test.

Unit II: Memory and Forgetting **20 periods**
(10 marks)

Nature of memory, information processing approach, levels of processings. Memory systems - Sensory memory; short - term memory, long - term memory, knowledge representation and organisation in memory, memory as a constructive process. Nature and causes of forgetting: Forgetting - causes, encoding failure, storage failure, retrieval failure, Amnesia.

Unit III: Self and Personality **18periods**
(10 marks)

Concepts of self, self-esteem, self-efficacy and self-regulation, culture and self, concept of personality, major approaches - type and trait;

Unit V : Coping with life challenges 13 periods (7 marks)

What is adjustment?

Nature and source of stress, types of stress, copying with stress, factors facilitating positive health and well being.

Unit VI : Psychological disorders 16 periods (8 marks)

Meaning of abnormal behaviour, classifications of disorders, factors causing abnormal behaviour, types of disorders - anxiety disorders, mood disorders, schizophrenic disorders, substances relating to disorders; behavioural disorders, personality disorders.

Unit VII: Therapeutic approaches 16 periods (8 marks)

Nature and process of therapy, types of therapies - bio medical, cognitive, psycho-dynamic, behavioural rehabilitation of mentally ill.

Unit VIII: Language and communication 10 periods (5 marks)

Introduction - nature of human languages, communication process, verbal and non-verbal communication, barriers to communications.

Unit IX: Psychology and social Problems 16 periods (8 marks)

Introduction; social problems - poverty and social disadvantages, challenges for national integration, gender discrimination, population explosion, impact of media and communication.

Unit X: Social Influence and Group Processes 16 periods (8 marks)

Introduction, nature of groups, formation of groups, types of groups, factors influencing group formations, functions of group, influence of group on individual behaviour, leadership style, co-operation and competition.

Unit XI: Statistics in Psychology 22 periods (10 marks)

What is Statistics? Measure of central tendency; graphical representation of data-bar, histogram and polygon.

PSYCHOLOGY (Project)
Marks: 10

The students shall be required to undertake one project. The project would involve the use of different methods of inquiry and related skills, related to the topics covered in the course.

a) Reporting file including project work **7 marks**

b) Viva-voce **3 marks**

Recommended books:

1. Introduction to Psychology Part I & II, NCERT

2. Introduction to Psychology
C.T. Morgan and R.A. King, Mc Graw Hill Book Company

3. Educational Psychology
S.K. Mangal, Tandon Publications

PHILOSOPHY

Objectives:

Philosophy, a theoretical enterprise with practical applications, aims at understanding the nature and meaning of life and Reality. It is considered to be the mother of all branches of knowledge. The nature of Philosophy is that in it no answer is left unquestioned. It attempts to understand and explain the fundamental anxious and presuppositions which are taken for granted by all branches of knowledge. The +2 syllabus is designed to give the students a glimpse of the nature of problems and the way they are dealt with in its various branches – Logic, Ethics, Classical Indian philosophy and Western philosophy.

CLASS –11
PHILOSOPHY

Unit-wise weightage

Time: 3 Hrs.
Marks: 100

Units	Periods	Marks
PART A: SCIENTIFIC METHOD	**80**	**50**
I. Nature and method of Induction	15	11
II. Observation and Experiment	20	12
III. Science and Hypothesis	20	12
IV. Mill's Method of Experimental Inquiry	25	15
PART B : LOGIC	**100**	**50**
V. The Nature and subject matter of logic	20	8
VI. Terms and Propositions; Relation	30	15
VII. Categorical syllogism	30	15
VIII. Symbolic Logic	20	12
Total	**180**	**50**

Part A: SCIENTIFIC METHOD

Unit-I: Nature and Method of Induction 15 periods (11 marks)

General nature and methods of Induction, Difference between Induction and deduction, Scientific Induction and its characteristics, Difference between scientific induction and Induction per simple enumeration.

Unit-III: Science and Hypothesis **20 periods**
(12 marks)

The place of Hypothesis in Scientific methods. Formulation of relevant hypothesis, formal conditions of valid hypothesis.

Unit-IV: Mill's Methods of Experimental Inquiry **25 periods**
(15 marks)

The method of Agreement.
The method of Difference.
The joint method of Agreement and Difference.
The method of concomitant variation.
The method of Residue.

Part B : LOGIC

Unit-IV : The Nature and Subject matter of Logic **20 periods**
(8 marks)

What is Logic? Use and application of Logic. Is logic a Science or an Art? Formal and material logic. Difference between Truth and Validity.

Unit-VI: Terms and Propositions **30 periods**
(15 marks)

Definitions of terms. Denotation and connotation of terms. Definition of Proposition and traditional classification of Propositions. Distribution of terms, copula and its nature. Relation between proposition, traditional square of proposition.

Unit-VII: Categorical syllogism **20 periods**
(15 marks)

Its definition, Rules of valid syllogism, Figure.
Fallacies: four terms, illicit major, illicit minor, undistributed middle, exclusive premise, drawing an affirmative conclusion from a negative Premise, Existential fallacy.

Unit-VIII:Symbolic Logic **20 periods**
(12 marks)

Value of using symbols in logic.
Basic Truth Table: Tautology, contingent, contradictory.

Recommended books:

1. *Textbook of Inductive Logic*
   by Bhola Nath Roy.

2. *Textbook of Deductive Logic*
   by Bhola Nath Roy.

3. *Introduction to Logic*
   by I.M. Copi.

CLASS – 12
PHILOSOPHY

Unit-wise weightage

Time: 3 Hrs. **Marks: 100**

Units	Periods	Marks
PART A : INDIAN PHILOSOPHY	**72**	**40**
I. Nature and Schools of Indian Philosophy	15	8
II. Buddhism, Jainism	19	12
III. Nyaya, Vaisesika and Samkhya – Yoga	24	10
IV. Advaita Vedanta	14	10
PART B : RELIGION	**24**	**15**
V. Concept of Religion		
PART C : WESTERN PHILOSOPHY	**59**	**45**
VI . Definition and Scope of Philosophy	14	6
VII. Theory of Knowledge	14	8
VIII. Nature of Reality	14	10
IX. Realism and Idealism	8	8
X. Ethics and Social Philosophy	9	13
Total	**180**	**100**

PART A: INDIAN PHILOSOPHY

Unit- I: Nature and schools of Indian Philosophy **15 periods**
(8 marks)

Definition of Indian Philosophy, Orthodox (astika) schools and Heterodox (nastika) schools.

Unit-II: Buddhism, Jainism **19 periods**
(12 marks)

Four Noble-truths, Eight fold-path, Anekantavada and Syadvuda.

Unit-III: Nyaya, Vaisesika and Samkhya **24 periods**
(10 marks)

Nyaya theory of Pramanas, Yoga theory of Eight-fold practice, Samkhya theory of Prakriti, Purusa and the three Gunas, Vaisesika theory of Padarthas.

Unit-IV: Advaita Vedanta **14 periods**
(10 marks)

The nature of Atman, Brahman and the World.

PART C: WESTERN PHILOSOPHY

Unit-VI: Definition and Scope of Philosophy. 14 periods (6 marks)

Unit-VII: Theory of Knowledge 14 periods (8 marks)

Rationalism and Empiricism.

Unit-VIII: Nature of Reality 14 periods (10 marks)

Proofs for the existence of God: Ontological, Teleological, Cosmological arguments.

Unit-IX: Realism and Idealism 8 periods (8 marks)

Unit-X: Ethics and Social Philosophy 9 periods (13 marks)

Nature of Morality, the concept of Good and right, theories of Punishment.

Nature and scope of social Philosophy and its relation to social psychology and sociology. The concept of social Justice.

Recommended books:

1. *Textbook of Inductive Logic by Bhola Nath Roy.*
2. *Textbook of Deductive Logic by Bhola Nath Roy.*
3. *Introduction to Logic by I.M. Copi.*

SOCIOLOGY

Objectives:

1 To enable learners to look at social reality objectively.

2 To inculcate among the learners Scientific temper and ability to perceive reality.
2 To introduce them to the basic concepts of Sociology that would enable them to observe and interpret social life.
3 To exemplify these concepts with reference to empirical situations in India.
4 To make the learners familiar with the contemporary processes of development and change.
5 To build the capacity of students to understand and analyse the changes in contemporary Indian society.

CLASS - 11

SOCIOLOGY

Unit wise weightage

Time: 3 Hrs.
Marks: 100

Unit		Periods	Marks
PART A:	**INTRODUCING SOCIOLOGY**		
I.	Sociology as a Discipline	18	10
II.	Basic Concepts	20	10
III.	Social Institutions	27	16
IV.	Culture and Social Processes	22	12
V.	Methods and Techniques of Social Research	15	8
PART B:	**UNDERSTANDING SOCIETY**		
VI.	Social Structure	15	8
VII.	Social Stratification	18	10
VIII.	Environment and Society	15	8
IX.	Western Social Thinkers	15	10
X.	Indian Sociologists	15	8
	Total	**180**	**100**

PART A: INTRODUCING SOCIOLOGY

Unit I: Sociology as a discipline **18 periods**

(10 marks)

a. Definition, Origin, Nature, Scope of Sociology.
b. Relationship with other Disciplines.

Unit II: Basic Concepts **20 periods**

(10 marks)

a. Society: Meaning, Definition, Characteristic.
b. Social Groups: Primary and Secondary, In-group and Out-group, Formal and Informal

c. Kinship : Definition, Types, Incest Taboo, Degrees, Usages, Terminologies.
d. Economic Systems : Primitive, Agrarian, Industrial, Mixed economy, Developed and Developing economy.
e. Political System : Power and Authority, Monarchy, Democracy.
f. Religion : Definition, Magic, Religion and Science.
g. Education : Meaning, Formal and Informal.

Unit IV: Culture and Social Processes **22 periods**

(12 marks)

a. Culture : Definition,Characteristics, Material and Non-material Culture.
b. Socialization: Meaning, Agencies.
c. Social Processes : Meaning of Co - operation, Accommodation, Assimilation, Competition and Conflict.

Unit V: Methods and Techniques of Social Research **15 periods**

(8 marks)

a. Observation: Participant, Non-participant.
b. Interview, Schedule and Questionnaire.

PART B :UNDERSTANDING SOCIETY.

Unit VI: Social Structure. **15 periods**

(8 marks)

a. Social Structure : Meaning and Elements (Status, Role, Norms, Values)
b. Social Function : Manifest and Latent.

Unit VII: Social Stratification. **18 periods**

(10 marks)

a. Social Stratification : Meaning, Types of Stratification (caste and class)
b. Social Inequalities with reference to power, Ethnicity, Gender.

Unit VIII: Environment and Society **15 periods**

(8 marks)

a. Social Ecology: Meaning.
b. Relationship of Environment and Society.
c. Rural-Urban Continuum.

Unit IX : Western Social Thinkers **15 periods**

(10 marks)

a. Karl Marx on class conflict.

b. Emile Durkheim on division of Labour.

c. Max Weber on Bureaucracy**.**

Unit X : Indian Sociologists 15 periods

(8 marks)

a. G.S. Ghurye on Caste.

b. Radhakamal Mukerjee on Values.

c. D.P. Mukerji on Tradition and Modernity.

Recommended book:

Sociology for class 11
by Dr. Kedilezo Kikhi, Alphonsus D'Souza & Visakhonü Hibo.
Nagaland University.
Heritage Publishing House
Opp. IMC, Circular Road,
Dimapur – 797112.

CLASS - 12
SOCIOLOGY

Unit-wise weightage
Time: 3 Hrs.

Marks: 100

Units		Periods	Marks
PART A :	**STRUCTURE OF INDIAN SOCIETY**		
I.	The challenges of unity in diversity	15	8
II.	Structure of Society	15	8
III.	Institutional Structure	24	12
IV.	Social Inequality	22	12
V.	Society in Nagaland	22	12
PART B :	**SOCIAL CHANGE IN INDIA**		
VI.	Process of social change in India	18	10
VII.	State and social change	14	8
VIII.	Economic development and social change	20	12

(8 marks)

a. Diversities in India and factors of unity : (Geographic, Religious, Cultural, Political, Linguistic, Racial).
b. Problems of communalism, regionalism, casteism.

Unit II: Structure of Society 15 periods
(8 marks)

a. Demographic Structure : population growth, birth, death or mortality, migration, age and sex composition, rural and urban distribution, literacy, present population policy in India.
b. Rural-urban divide and linkages in India.

Unit III: Institutional Structure 24 periods
(12 marks)

a. Marriage, family and kinship in India: Ways of acquiring mates among the tribal communities. Marriage among-Hindus, Muslims, Christians. Joint family in India-Meaning and changes, social functions of kinship in India.
b. Major religions in India: Origin and basic tenets of Hinduism, Islam, Christianity, Sikhism, Jainism, Buddhism.

Unit IV: Social Inequality 22 periods
(12 marks)

a. Caste prejudice, scheduled castes and other backward classes.
b. Scheduled Tribes : Problems and measures.
c. Women : Status, measures to empower them.
d. The protection of Religious minorities.
e. Caring for the disabled.

Unit V: Society in Nagaland 22 periods
(12 marks)

a. People : Tribes and Festivals.
b. Economy : Shifting cultivation and terrace cultivation
c. Religion : Traditional religion and Christainity.
d. Education : Traditional Institution, Advent of modern education.
e. Statehood and special provisions in the constitution of India.

PART B: SOCIAL CHANGE IN INDIA

Unit VI: Processes of Social change in India. 18 periods
(10 marks)

a. Structural Processes : Social consequences of Industrialisation, urbanization, modernization.
b. Cultural Processes : Sanskritisation, Westernisation, Secularisation.

Unit VII: State and Social change. 14 periods
(8 marks)

a. Panchayati Raj : Meaning and aims, challenges of social transformation.
b. Social Legislation : Meaning and important laws in favour of women and children.

Unit VIII: Economic development and Social change. 20 periods

(12 marks)

a. Land Reforms : Meaning, objectives of land reforms in India.
b. Green Revolution : Meaning, consequences.
c. Globalisation and Liberalisation : Meaning and Implication.

Unit IX: Education, Media and Social change. 14 periods
(8 marks)

a. Education as a factor of social change.
b. Media and Social change.

Unit X: Social Movements and Deviance. 16 periods
(10 marks)

a. Social Movements : Meaning and Types.
b. Social Deviance : Crime and Violence:- Meaning and types, Juvenile Delinquency, White-collar crime, organised crime, alcoholism, drug-addiction.

Recommended book:

Sociology for class 12
by Dr. Kedilezo Kikhi, Alphonsus D'Souza & Visakhonü Hibo.
Nagaland University.
Heritage Publishing House
Opp. IMC, Circular Road,
Dimapur – 797112.

GEOGRAPHY

Objectives

The course in Geography will help learners to:

1 Familiarise themselves with the terms, key concepts and basic principles of geography;

2 Search for, recognize and understand the processes and patterns of the spatial arrangement of the natural as well as human features and phenomena on the earth's surface;

3 Understand and analyse the inter-relationship between physical and human environments and their impact;

4 Apply geographical knowledge and methods of inquiry to new situations or problems at different levels-local/regional, national and global;

5 Develop geographical skills, relating to collection, processing and analysis of data/information and preparation of report including maps and graphics and

use of computers wherever possible; and

6 Utilize geographical knowledge in understanding issues concerning the community such as environmental issues, socio-economic concerns, gender and become responsible and effective member of the community.

CLASS - 11
GEOGRAPHY (Theory)

Unit-wise weightage
Theory Paper **Time: 3 Hrs.**
Marks: 70

Unit	Periods	Marks
PART A: FUNDAMENTALS OF PHYSICAL GEOGRAPHY	**-**	**35**
I. Geography as a discipline	5	3
II. The Earth	10	5
III. Landforms	16	8
IV. Climate	30	10
V. The Oceans	8	4
VI. Life on the Earth	6	3
VII. Map Work		2
PART B: INDIA – PHYSICAL ENVIRONMENT	**-**	**35**
VIII. Introduction	5	5
IX. Physiography	16	10
X. Climate, Vegetation and Soil	30	10
XI. Natural Hazards and Disasters	14	7
XII. Map Work		3
Total	**140**	**70**

Practical Paper **Marks: 30**

PART C: PRACTICAL		
1. Fundamentals of Cartography	12	12
2. Topography and Weather Maps	28	10

(3 marks)

Nature, Scope and evolution of geography as a discipline.
Branches of geography with emphasis on the importance of physical geography.

Unit II: The Earth. 10 periods
(5 marks)

Origin and evolution of the Earth; Interior of the earth; Earthquakes and volcanoes – their types and distribution; Wegeners continental drift theory, plate tectonics, sea floor spreading.

Unit III: Landforms. 16 periods
(8 marks)

Rocks: major types of rocks and their characteristics; Soils – major types and formation;
Concepts of evolution of land forms, Hierarchy of land forms.
Geomorphic processes – weathering and mass wasting, works of running water, wind, glacier and waves.

Unit IV: Climate. 30 periods
(10 marks)

Atmosphere – composition and structure, elements of weather and climate. Insolation – factors controlling insolation distribution; Heat budget of the earth – heating and cooling of atmosphere, conduction, convection, terrestrial radiation, advection; Temperature – factors controlling temperature, horizontal and vertical distribution of temperature, inversion of temperature; Pressure – pressure belts, winds – planetary, periodical and local; air masses, fronts and cyclones.
Precipitation – types – Rainfall – types and distribution; types of cloud. Hydrological cycle.
World climate – classification (Trewartha), greenhouse effect, global warming and climatic changes.

Unit V: The Oceans. 8 periods
(4 marks)

Water bodies on the earth's surface – types; Relief of the ocean floor. Distribution of temperature and salinity of oceans; Types and distribution of ocean currents.

Unit VI: Life on the Earth. 6 periods
(3 marks)

The biosphere classification of organisms; Ecosystems – components (biotic and abiotic) and types (terrestrial, aquatic, man-made); conservation of ecosystems.

Unit VII: Map Work. (2 marks)

Map works-for identification only/relating to Units 1-VI.
Map work on World map.

PART B : INDIA PHYSICAL ENVIRONMENT

Unit VIII: Introduction. 5 periods (5 marks)

Location, and its factor in shaping India's place in the world. Geological history.

Unit IX: Physiography. 16 periods (10 marks)

Geological structure, physiographic divisions, Drainage system (with emphasis on the Himalayas and the Peninsular); concept of watershed.

Unit X: Climate, Vegetation and Soil. 30 periods (10 marks)

Weather and climate – Spatial and temporal distribution of temperature, pressure, winds and rainfall; Mechanism of the monsoon, monsoon seasons, impact of the monsoon on the people of the region; climatic regions of India.

Natural Vegetation – types and distribution, conservation and management of forests; wildlife – conservation and management.

Soil – classification (ICAR) and distribution, conservation of soil.

Unit XI: Natural Hazards and Disasters. 14 periods (7 marks)

Causes, consequences and Management.

Earthquakes, Landslides, Droughts, Floods, Cyclones.

Unit XII: Map works, relating to Units –VII-XI. (3 marks)

PART C : PRACTICAL (30 marks)

1. Fundamentals of Cartography. 12 periods (12 marks)

Maps – types; Scale – types; construction of Linear scale, measuring distance, finding directions (in the field and on the map), use of conventional symbols in topographic maps and weather maps.

Latitudes, Longitudes and time.

Map projection-graphical construction of cylindrical equal area, Conical with one standard parallel and zenithal equidistant along with properties and uses.

2. Topographic and Weather Maps. 28 periods (10 marks)

Study of topographic maps; contour cross – section and identification of

landforms (hills, valleys, waterfalls, cliffs).
Air-photos and satellite imageries; identification of physical and cultural features on the basis of tone and shape. Use of weather instruments and weather charts; wet and dry bulb thermometer, barometer, windvane, rainguage; use of weather charts describing pressure, wind and rainfall distribution.

3. Practical Record Book. (5 marks)

4. Viva Voce. (3 marks)

NOTE : No question paper for practical work will be set by the Board.

Recommended books:

1. *V.K. Geograph y(Theory & Practical)*
   by Yash Pal Singh
   V.K. (India), 4323/3, Ansari Road.
   New Delhi – 110002.

2. *A textbook of Geography*
   by Sanjana Mahajan & R.K. Gupta,
   Arya Publications,1569/30, Naiwala,
   Karol Bagh, New Delhi – 110005.

CLASS - 12
GEOGRAPHY (Theory)

Unit-wise weightage
Theory Paper **Time: 3 Hrs.**
Marks: 70

Unit		Periods	Marks
PART A: FUNDAMENTALS OF HUMAN GEOGRAPHY			
Unit I.	Human Geography	5	3
Unit II.	People	15	5
Unit III.	Human Activities	25	8
Unit IV.	Transport, Communication and Trade	20	12
Unit V.	Human Settlements	10	5
Unit VI.	Map Work		2
PART B: PEOPLE AND ECONOMY			
Unit VII.	People	12	5
Unit VIII.	Human Settlements	10	4
Unit IX.	Resources and Development	31	12
Unit X.	Transport, Communication and International Trade	12	7
Unit XI.	Geographical Perspective on selected issues and problems	10	4
Unit XII.	Map Work		3
	Total	**150**	**70**
Practical Paper			**Marks 30**
PART C : PRACTICAL			
1.	Processing of Data and Thematic Mapping	20	12
2.	Field Study or Spatial Information Technology	10	10
3.	Practical Record Book		5
4.	Viva Voce		3
	Total	**30**	**30**

PART A : FUNDAMENTALS OF HUMAN GEOGRAPHY

Unit I: Human Geography. **5 periods**
(3 marks)

Nature & scope.

Unit II: People. **15 periods**

Unit III: Human Activities. **25 periods**
(8 marks)

Primary – concept and changing trends; gathering, pastoral mining, subsistence agriculture, modern agriculture; people engaged in agriculture and allied activities.
Secondary – concept; manufacturing industries; agro – processing, household, small scale and large scale industries, people engaged in secondary activities.
Tertiary – concept; education, health, business, transport and communication; people engaged in tertiary services.
Quaternary – concept; specialized knowledge-based activities.

Unit IV: Transport, Communication and Trade. **20 periods**
(12 marks)

Land Transport-roads and railways; Trans-continental railways.
Water Transport-in-land waterways; Major ocean routes and ports.
Air transport and the shrinking world; inter-continental air routes.
Oil and gas pipelines.
Mass Communications; Satellite communication including computer networking –internet;
International Trade – its basis and changing pattern; ports as gateways of international trade; role of WTO in international trade.

Unit V: Human Settlements. **10 periods**
(5 marks)

Settlement types – rural – urban; functional classification; problems of human settlement in developing countries.

Unit VI: Map work.
(2 marks)

PART B: INDIA – PEOPLE AND ECONOMY

Unit VII: People. **12 periods**
(5 marks)

Population; distribution and density; population change through time with regional variations.
The people of India – ethnic, linguistic and religious composition;
Demographic patterns in terms of rural-urban, age, sex.
Human Development – Regional patterns.

Unit VIII: Human Settlement. **10 periods**
(4 marks)

Rural – distribution pattern and types (Forms, Structure and function).
Urban – distribution, census; distribution of large cities.

Unit IX: Resources and Development. **31 periods**
(12 marks)

Resources – concept of resources; types and distribution; conservation of natural resources, sustainable development.
Water resources – availability and utilization; scarcity of water and

conservation methods – water harvesting and watershed management.
Land use – general land use, agriculture land use; Major crops (wheat, Rice, Tea, Coffee, Cotton, Jute, Sugar cane and Rubber); agricultural problems and development.
Mineral and energy resources, distribution; major metallic (Iron ore, Copper, Bauxite, Manganese), non-metallic (mica, salt) minerals; conventional (coal, petroleum, natural gas and hydro electricity) and non conventional energy source (solar, wind, biogas).
Industries – types and distribution, factors affecting industrial location; changing patterns of selected industries – iron and steel, cotton textile, sugar, petro chemical and knowledge based industries; impact of liberalization, privatization and globalisation on industries and its location.

Unit X: Transport communication and International Trade. 12 periods (7 marks)

Transport and communication – roads, railways, waterways and airways; oil and gas pipelines; national electric grids; communication networking-radio, television, satellite and computers.
International Trade – changing pattern of India's Foreign Trade; sea ports and airports as gateways of international trade.

Unit XI: Geographical perspective on selected issues and problems. 10 periods (4 marks)

Environment degradation
Hunger and poverty.
Urbanisation – growth of cities; rural – urban migration, problems of slums; urban – waste disposal management.

Unit XII: Map work.
(3 marks)

PART C: PRACTICAL

1. **Data Processing and Thematic Mapping. 20 periods (12 marks)**
   a. Data analysis, diagrams and maps.
   b. Tabulation and processing of data matrix; uses and calculating of averages, deviation measures and correlation.
   c. Representation of data – construction of diagrams (bars, circles and
   d. flow charts); preparation of thematic maps; dot, choropleth and isopleths.
   e. Use of computers in data processing and mapping.

2. **Field Study or Spatial Information Technology 10 periods (10 marks)**

Field trip: Map orientation, observation and preparation of sketch map; survey on any one of local concerns.

i) population,
ii) ground water changes,
iii) Land – use and land-use changes,
iv) Poverty,
v) Energy issues,
vi) Land degradation, and
vii) Drought and flood.

3. **Practical Record Book.** **5 marks**

4. **Viva Voce.** **3 marks**

Note: 1. In survey, observation and questionnaire method may be adopted for data collection.

2. (Any one topic of local concern maybe taken up for the study); observation and questionnaire survey may be adopted for data collection; collected data may be tabulated and analysed with diagrams and maps.

OR

Spatial Information Technology.

Use of computers : Components of computers, roster and vector data, data sources, data entry, data manipulation, construction of diagrams and data mappings.

Recommended books:

1. *V.K. (India),(Theory & Practical)*
4323/3, Ansari Road.
Darya Ganj,
New Delhi – 110002.

2. *A textbook of Geography*
by Sanjana Mahajan & R.K. Gupta,
Arya Publications,1569/30,
Naiwala,Karol Bagh, New Delhi – 110005.

EDUCATION

Objectives:

1 To familiarize students with ideas, practices, institutions and systems

prevailing in the field of education.

2 To make students aware of different thoughts given by educational thinkers.

3 To make the students understand that psychology and education are deeply related to each other.

4 To make students familiarized with basic concepts of educational psychology.

5 To give students a glimpse into the history of educational development.

6 To help them to understand the behavioural patterns of human beings.

7 To create in students an interest in the study of human behaviour.

8 To have a sympathetic understanding on others behaviour either as parents or as teachers in due course of their life.

CLASS - 11
EDUCATION

Unit-wise weightage

Time: 3 Hrs. **Marks:**

100

Unit	Periods	Marks
I. Concept of education	12	7
II. Aims of education	15	8
III. Types of education	18	10
IV. Educational Thinkers	15	8
V. Constitutional Provisions relating to education.	18	10
VI. Development of education in India	18	10

VII. Concept of freedom	15	8
VIII. Mahatma Gandhi and his contributions to education	10	6
IX. Indigenous institutions of education in India	15	8
X. Indigenous system of education in Nagaland	8	5
XI. Education for modernisation	12	7
XII. School and its influence	8	5
XIII. Concept of measurement and evaluation	16	8
Total	**180**	**100**

Unit I: Concept of Education **12 periods**
(7 marks)

a. Definitions
b. Meaning-narrow and wide.
c. Relation between literacy and education.

Unit II: Aims of Education. **15 periods**
(8 marks)

a. Individual and Social.
b. Citizenship.
c. Vocational.
d. National Integration.

Unit III: Types of Education. **18 periods**
(10 marks)

a. Formal and Informal.
b. Agencies of formal education-
   School
   College
   NCERT
   UGC
   UNESCO
c. Agencies of Informal Education.
   Home
   Mass Media.

Unit IV: Educational Thinkers. **15 periods**
(8 marks)

a. Froebel
b. Pestalozzi
c. Maria Montessori
d. The relevance of their ideas in the present system of education.

Unit V: Constitutional Provisions Relating to Education. **18 periods**
(10 marks)

a. Free and Compulsory Education.
b. Language.
c. Minorities.
d. Religious matters.
e. Education of Scheduled Castes and Tribes.
f. Mother tongue.

Unit VI: Development of Education in India. **18 periods**
(10 marks)

a. Hunter's Commission-1882.

b. Gokhale's attempt for compulsory primary Education 1910-13
c. Mudhaliar's Commission-1952 for secondary education.
d. Kothari's Commission-1964-66.
e. New National Policy on Education-1986.

Unit VII: Concept of Freedom. 15 periods (8 marks)

a. Discipline.
b. Order.
c. Reward.
d. Punishment.

Unit VIII: Mahatma Gandhi and his contributions to Education. 10 periods (6 marks)

a. His Philosophy on Education.
b. Basic Education-
   Main Features
   Merit
   Demerits.

Unit IX: Indigenous Institutions of Education in India. 15 periods (8 marks)

a. Gurukula.
b. Pathsala.
c. Vedic.
d. Buddhist.
e. Islamic.
f. Contribution of Christian Missionaries.

Unit X: Indigenous System of Education in Nagaland. 8 periods (5 marks)

a. Family.
b. Morung.
c. Festivals.

Unit XI: Education for Modernisation. 12 periods (7 marks)

a. Meaning.
b. Role of education in modernising a Nation.
c. School and Modernity.
d. Right use of leisure.

Unit XII: School and its influence. 8 periods (5 marks)

a. Centre of community life.
b. Miniature Society.

Unit XIII: Concept of measurement and evaluation. 16 periods (8 marks)

a. Functions.
b. Types of examination.

c. Formative approach.
d. Summative approach.
e. Continuous and comprehensive evaluation.

Recommended book :

Education for class 11
by V.A.Jose
Livingstone Publishing House
107-A/3 Sudarshan Cinema Road,
Gautam Nagar, New Delhi-11049

CLASS - 12
EDUCATION

Unit-wise weightage

Time: 3 Hrs.
Marks: 100

Unit	Periods	Marks
I. Education and Psychology	18	10
II. Growth and Development	15	8
III. Heredity and Environment	18	10
IV. Physical basis of mental life	13	7
V. Stages of human development	18	10
VI. Mental health and hygiene	10	5
VII. Memory and Forgetting	18	10
VIII. Learning	15	8
IX. Attention and Interest	15	8
X. Habits	8	5
XI. Intelligence	12	7
XII. Personality	12	7
XIII. Concept of individual differences	8	5
Total	**180**	**100**

Unit I: Education and Psychology **18 periods (10**

marks)

- Meaning
- Nature
- Difference between growth and development
- Principles and characteristics
- Development and education

Unit III: Heredity and Environment 18 periods (10 marks)

- Meaning of heredity and environment
- Laws of heredity
- Relation between heredity and environment
- Educational significance

Unit IV: Physical Basis of Mental life 13 periods (7 marks)

- Central nervous system
- Receptors
- Effectors
- Sensation
- Perception
- Conception

Unit V: Stages of Human Development 18 periods (10 marks)

- Infancy
- Childhood
- Adolescence
- Physical, emotional, intellectual and social development in each stage
- Educational significance of each stage.

Unit VI: Mental Health and Hygiene. 10 periods (5 marks)

- Meaning
- Characteristics
- Nature & Scope
- Forms of Maladjustment
- Factors of Mental health in School

Unit VII: Memory and Forgetting 18 periods (10 marks)

- Definitions
- Factors of memory
- Signs of good memory
- Improvement of memory
- Meaning of forgetting
- Causes of forgetting

Unit VIII:Learning **15 periods (8 marks)**

- Meaning and definitions
- Methods of learning
  - Imitation
  - Trial and Error
  - Insightful
  - Conditioning
- Laws of learning
  - Law of exercise
  - Law of readiness
  - Law of effect

Unit IX: Attention and Interest **15 periods (8 marks)**

- Meaning and Definitions
- Conditions of Attention
- Types of Attention
- Characteristics of interest
- Relation between attention and interest.

Unit X: Habits **8 periods (5 marks)**

- Nature of habits
- Formation of habits
- Advantages of habit formation
- Breaking of bad habits

Unit XI: Intelligence **12 periods (7 marks)**

- Meaning and definitions
- Theories of Intelligence
  - Monarchic theory
  - Anarchic theory
  - Two- factor theory
  - Measurement of intelligence concept of I Q

Unit XII: Personality **12 periods (7 marks)**

- Meaning and definitions
- Nature and characterstics
- Types of Personality:
  - Extroverts
  - Introverts
  - Ambiverts
- Methods of Personality Assessment:
  - Interview

- Case study
- Questionnaire
- Rating Scale

Unit XIII: Concept of Individual Differences 8 periods (5 marks)

- Meaning
- Areas of individual differences
- Educational Implications

Recommended books: -

1. *Education for class 12*
   by V.A. Jose
   Livingstone Publishing House
   New Delhi – 110049

MATHEMATICS

Objectives:

The broad objectives of teaching Mathematics at Higher Secondary School stage intend to help the pupil to:

1 acquire knowledge and critical understanding, particularly by way of motivation and visualization, of basic concepts, terms, principles, symbols and mastery of underlying processes and skills.

2 feel the flow of reasons while proving a result or solving a problem.

3 apply the knowledge and skills acquired to solve problems and wherever possible, by more than one method.

4 develop positive attitude to think, analyze and articulate logically.

5 develop interest in the subject by participating in related competitions.

6 acquaint students with different aspects of mathematics used in daily life.

7 develop an interest in students to study mathematics as a discipline.

8 develop awareness of the need for national integration, protection of environment, observance of small family norms, removal of social barriers, elimination of sex biases.

1 develop reverence and respect towards great mathematicians for their contributions to the field of mathematics.

CLASS - 11
MATHEMATICS

Unit-wise weightage

Time: 3 Hrs. Marks: 100

Units	Periods	Marks

I.	Sets and Functions	40	26
II.	Algebra	56	37
III.	Coordinate Geometry	33	16
IV.	Calculus	18	6
V.	Mathematical Reasoning	8	3
VI.	Statistics and Probability	25	12
	Total	**180**	**100**

UNIT-I: SETS AND FUNCTIONS

26 marks

1. Sets :

(08 periods)

Sets and their representations. Empty set. Finite & Infinite sets. Equal sets. Subsets. Subsets of the set of real numbers especially intervals (with notations). Power set. Universal set. Venn diagrams. Union and Intersection of sets. Difference of sets. Complement of a set.

2. Relations & Functions:

(12 periods)

Ordered pairs, Cartesian product of sets. Number of elements in the cartesian product of two finite sets. Cartesian product of the reals with itself (upto RxRxR). Definition of relation, pictorial diagrams, domain, codomain and range of a relation. Function as a special kind of relation from one set to another. Pictorial representation of a function, domain, co-domain & range of a function. Real valued function of the real variable, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum and greatest integer functions with their graphs. Sum, difference, product and quotients of functions.

3. Trigonometric Functions:

(20 periods)

Positive and negative angles. Measuring angles in radians & in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity $\sin^2 x + \cos^2 x = 1$, for all x. Signs of trigonometric functions and sketch of their graphs. Expressing $\sin(x+y)$ and $\cos(x+y)$ in terms of $\sin x$, $\sin y$, $\cos x$ & $\cos y$. Deducing the identities like the following:

$\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \pm \tan x \tan y}$, $\cot(x \pm y) = \frac{\cot x \cot y \mu 1}{\cot x \pm \cot y}$,

$\sin x + \sin y = 2 \sin \frac{x+y}{2} \cos \frac{x-y}{2}$, $\cos x + \cos y = 2 \sin \frac{x+y}{2} \cos \frac{x-y}{2}$,

$\sin x - \sin y = 2 \cos \frac{x+y}{2} \sin \frac{x-y}{2}$, $\cos x - \cos y = 2 \sin \frac{x+y}{2} \sin \frac{x-y}{2}$

Identities related to $\sin 2x$, $\cos 2x$, $\tan 2x$, $\sin 3x$, $\cos 3x$ and $\tan 3x$. General solution of trigonometric equations of the type $\sin\theta = \sin\alpha$, $\cos\theta = \cos\alpha$ and $\tan\theta$

UNIT-II: ALGEBRA
37 marks

1. Principle of Mathematical Induction:
(04 periods)

Processes of the proof by induction, motivating the application of the method by looking at natural numbers as the least inductive subset of real numbers. The principle of mathematical induction and simple applications.

2. Complex Numbers and Quadratic Equations:
(10 periods)

Need for complex numbers, especially to be motivated by inability to solve every quadratic equation. Brief description of algebraic properties of complex numbers. Argand plane and polar representation of complex numbers. Statement of Fundamental Theorem of Algebra, solution of quadratic equations in the complex number system.

3. Linear Inequalities:
(10 periods)

Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solution of linear inequalities in two variables. Solution of system of linear inequalities in two variables – graphically.

4. Permutations & Combinations:
(12 periods)

Fundamental principle of counting. Factorial *n.* Permutations and Combinations, derivation of formulae and their connections, simple applications.

5. Binomial Theorem: (08 periods)

History, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, General and middle term in binomial expansion, simple applications.

6. Sequence and Series:
(12 periods)

Sequence and Series. Arithmetic Progression (A.P.), Arithmetic Mean (A.M.). Geometric progression (G.P.), general term of a G.P., sum of *n* terms of a G.P., Geometric Mean (G.M.), relation between A.M. and G.M. Sum to *n* terms of the special series Σn, Σn^2 and Σn^3.

UNIT-III: COORDINATE GEOMETRY
16 marks

1. Straight Lines: (09 periods)

Brief recall of 2D from earlier classes. Slope of a line and angle between two lines

Various forms of equations of a line: parallel to axes, point - slope form, slope-intercept form, two-point form, intercepts form and normal form. General equation of a line. Distance of a point from a line.

2. Conic Sections: (16 periods)

Sections of a cone: circle, ellipse, parabola, hyperbola, a point, a straight line and pair of intersecting lines as a degenerated case of a conic section. Standard equations and simple properties of parabola, ellipse and hyperbola. Standard equation of a circle.

3. Introduction to Three - dimensional Geometry (08 periods)

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point. Distance between two points and section formula.

UNIT-IV: CALCULUS 6 marks

1. Limits and Derivatives: (18 periods)

Derivative introduced as rate of change both as that of distance function and geometrically, intuitive idea of limit. Definition of derivative, relate it to slope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.

UNIT-V: MATHEMATICAL REASONING
3 marks

1. Mathematical Reasoning: (08 periods)

Mathematically acceptable statements. Connecting words/ phrases - consolidating the understanding of "if and only if (necessary and sufficient) condition", "implies", "and/or", "implied by", "and", "or", "there exists" and their use through variety of examples related to real life and Mathematics. Validating the statements involving the connecting words – difference between contradiction, converse and contrapositive.

UNIT-VI: STATISTICS & PROBABILITY
12 marks

1. Statistics:
(10 periods)

Measure of dispersion; mean deviation, variance and standard deviation of ungrouped/grouped data. Analysis of frequency distributions with equal means but different variances.

2. Probability:

(15 periods)

Random experiments: outcomes, sample spaces (set representation). Events: occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events. Axiomatic (set theoretic) probability, connections with the theories of earlier classes. Probability of an event, probability of 'not', 'and' & 'or' events.

Recommended book:

Mathematics for class 11
by R.S. Aggarwal
Bharati Bhawan
4271/3 Ansari Road, Darya Ganj,
New Delhi – 110002.

CLASS - 12
MATHEMATICS

Unit-wise weightage
Time: 3 Hrs.
Marks: 100

Units	**Periods**	**Marks**
I. RELATIONS AND FUNCTIONS	18	10
II. ALGEBRA	34	13
III. CALCULUS	78	44
IV. VECTORS AND THREE - DIMENSIONAL GEOMETRY	22	17
V. LINEAR PROGRAMMING	10	6
VI. PROBABILITY	18	10
Total	**180**	**100**

UNIT I: RELATIONS AND FUNCTIONS
10 marks

1. Relations and Functions :
(10 periods)

Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions, composite functions, inverse of a function. Binary operations.

2. Inverse Trigonometric Functions: (08 periods)

Definition, range, domain, principal value branches. Graphs of inverse trigonometric functions. Elementary properties of inverse trigonometric functions.

UNIT-II: ALGEBRA

13 marks

1. Matrices:

(16 periods)

Concept, notation, order, equality, types of matrices, zero matrix, transpose of a matrix, symmetric and skew symmetric matrices. Addition, multiplication and scalar multiplication of matrices, simple properties of addition, multiplication and scalar multiplication. Non-commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Concept of elementary row and column operations. Invertible matrices and proof of the uniqueness of inverse, if it exists (Here all matrices will have real entries).

2. Determinants:

(18 periods)

Determinant of a square matrix (up to 3 x 3 matrices), properties of determinants, minors, cofactors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.

UNIT-III: CALCULUS

44 marks

1. Continuity and Differentiability:

(18 periods)

Continuity and differentiability, derivative of composite functions, chain rule, derivatives of inverse trigonometric functions, derivative of implicit function. Definition and laws of logarithms. Concept of exponential and logarithmic functions and their derivative. Logarithmic differentiation. Derivative of functions expressed in parametric forms. Second order derivatives. Rolle's and Lagrange's Mean Value Theorems (without proof) and their geometric interpretations.

2. Applications of Derivatives:

(16 periods)

Applications of derivatives: rate of change, increasing/decreasing functions, tangents & normals, approximation, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations).

3. Integrals:

(24 periods)

Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, only simple integrals

of the type

$$\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}$$

$$\int \frac{(px+q)}{ax^2 + bx + c} dx, \int \frac{(px+q)}{\sqrt{ax^2 + bx + c}} dx, \int \sqrt{a^2 \pm x^2}\, dx, \text{ and } \int \sqrt{x^2 - a^2}\, dx$$

to be evaluated.

Definite integrals as a limit of a sum, Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.

4. Applications of the Integrals:
(10 periods)

Applications in finding the area under simple curves, especially lines, areas of circles/ parabolas/ellipses (in standard form only), area between the two above said curves (the region should be clearly identifiable).

5. Differential Equations:
(10 periods)

Definition, order and degree, general and particular solutions of a differential equation. Formation of differential equation whose general solution is given. Solution of differential equations by method of separation of variables, homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type:

$\frac{dy}{dx}$ + py = q, where p and q are functions of *x*.

UNIT-IV: VECTORS AND THREE-DIMENSIONAL GEOMETRY

17 marks

1. Vectors: (10 periods)

Vectors and scalars, magnitude and direction of a vector. Direction cosines/ratios of vectors. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Scalar (dot) product of vectors, projection of a vector on a line. Vector (cross) product of vectors.

2. Three - dimensional Geometry:
(12 periods)

Direction cosines/ratios of a line joining two points. Cartesian and vector equation of a line, coplanar and skew lines, shortest distance between two lines. Cartesian and vector equation of a plane. Angle between (i) two lines, (ii) two planes, (iii) a line and a plane. Distance of a point from a plane.

UNIT-V: LINEAR PROGRAMMING

6 marks

1. Linear Programming:
(10 periods)

Introduction, definition of related terminology such as constraints, objective

function, optimization, different types of Linear Programming (L.P.) Problems, mathematical formulation of L.P. problems, graphical method of solution for problems in two variables, feasible and infeasible regions, feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

UNIT-VI: PROBABILITY

10 marks

1. **Probability:**
   (18 periods)

   Multiplication theorem on probability. Conditional probability, independent events, total probability, Baye's theorem, Random variable and its probability distribution, mean and variance of haphazard variable. Repeated independent (Bernoulli) trials and Binomial distribution.

Recommended book:

Mathematics for class 12
By R.S. Aggarwal
Bharati Bhawan
4271/3, Ansari Road,
Darya Ganj, New Delhi – 110002.

COMPUTER SCIENCE

Objectives:

2 To understand the problem statement.

3 To develop logic for problem solving.

4 To understand the concept of Object Oriented methodology.

5 To implement Object Oriented Programming using C+ +.

6 To understand the concept of working with a relational database.

7 To understand the basic concepts of Boolean algebra.

8 To understand and explore the world of communication networks.

CLASS - 11

COMPUTER SCIENCE (Theory)

Unit-wise weightage
Theory Paper **Time: 3 Hrs** **Marks: 70**

Unit		Periods	Marks
I.	Computer Fundamentals	30	10
II.	Programming Methodology	20	5
III.	Introduction to programming in C + +	80	40
IV.	Computer System Organisation	50	15
	Total	**180**	**70**

UNIT 1: COMPUTER FUNDAMENTALS **30 periods (10 marks)**

Evolution of computers; Basics of computer and its operation: Functional Components and their inter–connections, concept of Booting, Use of Operating System for directory listing, hierarchical directory structure, renaming, deleting files/folders, formatting floppy, copying files, concepts of path and pathname, switching between tasks, installation/removal of applications;

Software Concepts:

Types of Software: System Software, Utility Software and Application Software; System Software: Operating System, Compilers, Interpreters and Assembler; Operating System: Need for operating system, Functions of Operating System (Processor Management, Memory Management, File Management and Device Management), Types of operating system – Interactive (GUI based), Time Sharing, Real Time and Distributed; Commonly used operating systems: Solaris, UNIX, LINUX, Mac OS, MS Windows;
General functionalities of an Operating System to be illustrated and implemented using any of the above operating systems.

UNIT 2: PROGRAMMING METHODOLOGY **20 periods (5 marks)**

General Concepts; Modular approach; Clarity and Simplicity of Expressions, Use of proper Names for identifiers, Comments, Indentation; Documentation and Program Maintenance; Running and Debugging programs, Syntax Errors, Run–Time Errors, Logical Errors;

UNIT 3: INTRODUCTION TO PROGRAMMING IN C+ + **80 periods (40 marks)**

Programming by Example In C+ + Language :

C+ + character set, C+ + Tokens (Identifiers, Keywords, Constants, Operators), Structure of a C+ + Program (include files, main function); Header files – iostream.h, iomanip.h; **cout**, **cin**; Use of I/O operators (<< and >>), Use of endl and setw(), Cascading of I/O operators, Error Messages; Use of editor, basic commands of editor, compilation, linking and execution; standard input/output operations from C language: gets(), puts() of stdio.h header file;

Data Types, Variables and Constants:

Concept of Data types; Built–in Data types: **char**, **int**, **float** and **double**; Constants: Integer Constants, Character Constants (Backslash character constants – \n, \t), Floating Point Constants, String Constants; Access modifier: **const**; Variables of built–in data types, Declaration/Initialisation of variables, Assignment statement; Type modifier: signed, unsigned, long;

Operators and Expressions:
Operators: Arithmetic operators (–, +, *, /, %), Unary operator (–), Increment and Decrement Operators (– – ,+ +), Relational operators (>, >=, <, <=, = =, !=), Logical operators (!, &&, ||), Conditional operator: <condition>?<if true>:<else>; Precedence of Operators; Expressions; Automatic type conversion in expressions, Type casting; C+ + shorthands (+=, –=, *=, /=, %=);

Flow of control:
Conditional statements: **if–else**, Nested **if**, **switch..case..default**, Nested **switch..case**, break statement (to be used in switch..case only); Loops: **while**, **do – while** , **for** and Nested loops;

Structured Data Type: Array
Declaration/initialisation of One–dimensional array, Inputting array elements, Accessing array elements, Manipulation of array elements (sum of elements, product of elements, average of elements, linear search, finding maximum/minimum value); Declaration/Initialization of a String, string manipulations (counting vowels/ consonants/digits/special characters, case conversion, reversing a string, reversing each word of a string);

String Functions:
Header File: string.h
Functions: **isalnum(), isalpha(), isdigit(), islower(), isupper(), tolower(), toupper()**;

Character Functions:
Header File: ctype.h
Functions: **isalnum(), isalpha(), isdigit(), islower(), isupper(), tolower(), toupper(), strcpy(), strcat(), strlen(), strcmp(), strcmpi()**;

Mathematical Functions:
Header File–math.h, stdlib.h;
Functions: **fabs()**, **log()**, **log10()**, **pow()**, **sqrt()**, **sin()**, **cos()**, **abs(),**

Other Functions:
Header File– stdlib.h;
Functions: **randomize(), random()**;

Two–dimensional Array:
Declaration/initialisation of a two–dimensional array, inputting array elements, accessing array elements, manipulation of array elements (sum of row element, column elements, diagonal elements, finding maximum/minimum values);

User Defined Functions:
Defining a function; function prototype, invoking/calling a function, passing arguments to function, specifying argument data types, default argument, constant argument, call by value, call by reference, returning values from a function, calling functions with arrays, scope rules of functions and variables; local and global variables;

Event programming: Games as examples
General Guidelines: Initial requirement, developing an interface for user (it is advised to use text based interface screen), developing logic for playing the game and developing logic for scoring points.

1. Memory Game: A number guessing game with application of 2 dimensional arrays containing randomly generated numbers in pairs hidden inside boxes.
2. Cross 'N Knots Game: A regular tic–tac–toe game.
3. Hollywood/Hangman: A word guessing game.
4. Cows 'N Bulls: A word/number guessing game.

UNIT 4: COMPUTER SYSTEM ORGANISATION 50 periods (15 marks)

Number System: Binary, Octal, Decimal, Hexadecimal and conversion between two different number systems. Integer, Floating Point, 2's complement of number from base–2; Internal Storage encoding of Characters: ASCII, ISCII (Indian Scripts Standard Code for Information Interchange), and UNICODE;

Microprocessors: Basic concepts, Clock speed (MHz, GHz), 16 bit, 32 bit, 64 bit processors; Types – CISC, RISC; Concept of System Buses, Address bus, Data bus, Concepts of Accumulator, Instruction Register, and Program Counter;

Commonly used CPUs and CPU related terminologies: Intel Pentium Series, Intel Celeron, Cyrix, AMD Series, Xeon, Intel Mobile, Mac Series; CPU Cache; Concept of heat sink and CPU fan, Motherboard; Single, Dual and Multiple processors;

Types of Memory: Cache (L1,L2), Buffer, RAM (DRAM, SDRAM, RDRAM, DDRAM), ROM (PROM, EPROM), Hard Disk Drive, Floppy Disk Drive, CD/DVD Drive; Access Time;

Input Output Ports/Connections: Power connector, Monitor Socket, Serial (COM) and Parallel (LPT) port, Universal Serial Bus port, PS–2 port, SCSI port, PCI/MCI socket, Keyboard socket, Infrared port (IR), audio/speaker socket, Mic socket; data Bus; external storage devices connected using I/O ports;

Keyboards: QWERTY, Inscript, Multilingual, Dvorak

Printers: Dot Matrix Printer, Line Printer, Deskjet/Inkjet/Bubblejet Printer, Laser Printer;

Power Supply: Switched Mode Power Supply (SMPS): Elementary Concept of Power Supply: Voltage, Current, Power (Volt, Ampere, Watt), SMPS supplies – Mother Board,

Power Conditioning Devices: Voltage Stabilizer, Constant Voltage Transformer (CVT), Uninterrupted Power Supply (UPS)–Online and offline.

CLASS - 11
COMPUTER SCIENCE (Practical)

Practical Paper 3 hours Marks: 30

Unit		Marks
I. Programming in C++		10
II. Project Work		10
III. Practical file		5
IV. Viva voce		5
Total		**30**

1. **Programming in C**

10

One programming problem in C+ + to be developed and tested on computer during the examination. Marks are allotted on the basis of the following:

Logic : 5 Marks
Documentation/Indentation : 2 Marks
Output presentation : 3 Marks

2. **Project Work**

10

The project has to be developed in C+ + language with Object Oriented Technology.

1 Presentation on the Computer.
2 Project report (Listing, Sample, Outputs, documentation).
3 Viva Voice.

Guidelines for Project Work:

a. Preamble

(i) The academic course in computer Science includes one project in each year. The purpose behind is to consolidate the concepts and practices imparted during the course and to serve as a record of competence.

i. A group of two students/three students as a team may be allowed to work on one project.

b. Project content

(i) Project can be selected from one of the topics given in event programming.

(ii) The aim of the project is to highlight the abilities of algorithmic formulation, modular programming, optimized code preparation, systematic documentation and other associated aspects of software development.

(iii) The assessment will be done through the project demonstration and the project report, which should portray programming style, structured design, minimum coupling, high cohesion, good documentation of the code to ensure readability and ease of maintenance.

3. **Practical File**

05

Must have a minimum of 15 programs from the topics covered in class 11 course.

4. **Viva Voce**

05

Viva will be asked from the syllabus covered in class 11 and the project developed by the student.

NOTE : No question paper for practical work will be set by the Board.

Recommended book:

1. *Computer Science*
by Preeti Gehlot & Charu Gupta
Oxford University Press,
Pragiyotish Apartment (1st floor) M.Tayabulla Road,
Dighalipukhuri (East) Guwahati – 781001.

2. *Computer Science*
by Dheeraj Mehrotra
S.Chand & company Ltd, Ram Nagar,
New Delhi – 110055.

CLASS - 12
COMPUTER SCIENCE (Theory)

Unit-wise weightage
Theory Paper **Time: 3 Hrs.**

Marks: 70

Unit		Periods	Marks
I.	Programming in C + +	80	30
II.	Data Structures	40	16
III.	Databases and SQL	20	8
IV.	Boolean Algebra	20	8
V.	Communication and Network Concepts	20	8
	Total	**180**	**70**

UNIT I: PROGRAMMING IN C+ + **80 periods**
(30 marks)

Defining a symbol name using typedef keyword and defining a macro using #define directive;
Need for User defined data type;

Structures:
Defining a Structure, Declaring structure variables, Accessing structure elements, Passing structure to Functions as value and reference argument/parameter, Function returning structure, Array of structures, passing an array of structures as an argument/

a parameter to a function;

Object Oriented Programming:
Concept of Object Oriented Programming – Data hiding, Data encapsulation, Class and Object, Abstract class and Concrete class, Polymorphism (Implementation of polymorphism using Function overloading as an example in C+ +); Inheritance, Advantages of Object Oriented Programming over earlier programming methodologies,

Implementation of Object Oriented Programming concepts in C+ +:
Definition of a class, Members of a class – Data Members and Member Functions (methods), Using Private and Public visibility modes, default visibility mode (private); Member function definition: inside class definition and outside class definition using scope resolution operator (::); Declaration of objects as instances of a class; accessing members from object(s), Array of type class, Objects as function arguments – pass by value and pass by reference;

Constructor and Destructor:
Constructor: Special Characteristics, Declaration and Definition of a constructor, Default Constructor, Overloaded Constructors, Copy Constructor, Constructor with default arguments;
Destructor: Special Characteristics, Declaration and definition of destructor;

Inheritance (Extending Classes):
Concept of Inheritance, Base Class, Derived Class,
Defining derived classes, protected visibility mode; Single level inheritance, Multilevel
inheritance and Multiple inheritance, Privately derived, Publicly derived and Protectedly derived class, accessibility of members from objects and within derived class(es);

Data File Handling:
Need for a data file, Types of data files: Text file and Binary file;
Basic file operations on text file: Creating/Writing text into file, Reading and Manipulation of text from an already existing text File (accessing sequentially);
Binary File: Creation of file, Writing data into file, Searching for required data from file, Appending data to a file, Insertion of data in sorted file, Deletion of data from file, Modification of data in a file;
Implementation of above mentioned data file handling in C+ +;
Components of C+ + to be used with file handling:
Header file: fstream.h; ifstream, ofstream, fstream classes;
Opening a text file in **in**, **out**, and **app** modes;
Using cascading operators for writing text to the file and reading text from the file; **open()**, **get()**, **put()**, **getline()** and **close()** functions; Detecting end–of–file (with or without using **eof()** function);Opening a binary file using **in**, **out**, and **app** modes; **open()**, **read()**, **write()** and **close()** functions; Detecting end–of–file (with or without using **eof()** function); **tellg(), tellp(), seekg(), seekp()** functions.

Pointers:
Declaration and Initialization of Pointers; Dynamic memory allocation/deallocation operators: **new, delete;** Pointers and Arrays: Array of Pointers, Pointer to an

array (1 dimensional array), Function returning a pointer, Reference variables and use of alias; Function call by reference. Pointer to structures: Deference operator: *, –>; self referential structures;

UNIT II: DATA STRUCTURES 40 periods (16 marks)

Arrays:

One and two Dimensional arrays: Sequential allocation and address calculation; One dimensional array: Traversal, Searching (Linear, Binary Search), Insertion of an element in an array, deletion of an element from an array, Sorting (Insertion, Selection, Bubble sort), concatenation of two linear arrays, merging of two sorted arrays;

Two–dimensional arrays: Traversal, Finding sum/difference of two NxM arrays containing numeric values, Interchanging Row and Column elements in a two dimensional array;

Stack (Array and Linked implementation of Stack):

Operations on Stack (PUSH and POP) and its Implementation in C++, Converting expressions from INFIX to POSTFIX notation and evaluation of Postfix expression;

Queue:(Circular Array and Linked Implementation): Operations on Queue (Insert and Delete) and its implementation in C+ +.

UNIT III: DATABASES AND SQL 20 periods (8 marks)

Database Concepts:

Relational data model: Concept of domain, tuple, relation, key, primary key, alternate key, candidate key;

Relational algebra: Selection, Projection, Union and Cartesian product;

Structured Query Language:

General Concepts: Advantages of using SQL, Data Definition Language and Data Manipulation Language;

Data types: NUMBER, CHARACTER, DATE;

SQL commands: CREATE TABLE, DROP TABLE, ALTER TABLE, UPDATE...SET..., INSERT, DELETE; SELECT, DISTINCT, FROM, WHERE, IN, BETWEEN, GROUP BY, HAVING, ORDER BY;

SQL functions: SUM, AVG, COUNT, MAX and MIN;

Note: Implementation of the above mentioned commands can be done on any SQL supported software.

UNIT IV: BOOLEAN ALGEBRA 20 periods (8 marks)

Binary–valued Quantities, Boolean Variable, Boolean Constant and Boolean Operators: AND, OR, NOT; Truth Tables; Closure Property, Commutative Law, Associative Law, Identity law, Inverse law, Principle of Duality, Idempotent Law, Distributive Law, Absorption Law, Involution law, DeMorgan's Law and their applications;

Obtaining Sum of Product (SOP) and Product of Sum (POS) form from the Truth

Table, Reducing Boolean Expression (SOP and POS) to its minimal form, Use of Karnaugh Map for minimization of Boolean expressions (up to 4 variables);
Basic Logic Gates (NOT, AND, OR, NAND, NOR) and their use in circuits.

UNIT V: COMMUNICATION AND NETWORK CONCEPTS 20 periods (8 marks)

Evolution of Networking: ARPANET, Internet, Interspace;
Different ways of sending data across the network with reference to switching techniques;
Data Communication terminologies: Concept of Channel, Baud, Bandwidth (Hz, KHz, MHz) and Data transfer rate (bps, kbps, Mbps, Gbps, Tbps);
Transmission media: Twisted pair cable, coaxial cable, optical fiber, infrared, radio link, microwave link and satellite link.
Network devices: Modem, RJ45 connector, Ethernet Card, Hub, Switch, Gateway;
Different Topologies– Bus, Star, Tree; Concepts of LAN, WAN, MAN;
Protocol: TCP/IP, File Transfer Protocol (FTP), PPP, Level–Remote Login (Telnet), Internet,
Wireless/Mobile Communication, GSM, CDMA, WLL, 3G, SMS, Voice mail, Application Electronic Mail, Chat, Video Conferencing;
Network Security Concepts: Cyber Law, Virus threats and prevention, Firewall, Cookies, Hacking;

WebPages; Hyper Text Markup Language (HTML), eXtensible Markup Language (XML); Hyper Text Transfer Protocol (HTTP); Domain Names; URL; Protocol Address; Website, Web browser, Web Servers; Web Hosting.

CLASS - 12
COMPUTER SCIENCE (Practical)

Practical Paper **Time: 3 Hrs**

Marks: 30

Unit			**Marks**
I.	Programming in C++		10
II.	SQL Commands		5
III.	Project work		5
IV.	Practical File		5
V.	Viva Voce		5
	Total		**30**

1. **Programming in C+ +**

(10 marks)

One programming problem in C+ + to be developed and tested on computer during the examination. Marks are allotted on the basis of the following:

Logic : 5 Marks
Documentation/Indentation : 2 Marks
Output presentation : 3 Marks

Note: The types of problems to be given will be of application type from the following topics:

1 Arrays (one dimensional and two dimensional)

2 Array of structure
3 Stack using arrays and linked implementation
4 Queue using arrays (circular) and linked implementation
5 Binary File operations (creation, displaying, searching and modification)
6 Text File operations (creation, displaying and modification)

2. **SQL Commands**

(**5 marks)**

Five Query questions based on a particular Table/Relation to be tested practically on computer during the examination. The command along with the result must be written in the answer sheet.

3. **Project Work**

(**5 marks)**

The project has to be developed in C+ + language with Object Oriented Technology and also should have use of data files.

1 Presentation on the computer
2 Project report (Listing, Sample, Outputs, Documentation)
3 Viva

4. **Practical File**

(**5 marks)**

Must have minimum 20 programs from the following topics:

(**3 Marks)**

1 Arrays (one dimensional and two dimensional, sorting, searching, merging, deletion & insertion of elements)
2 Arrays of structures, arrays of objects
3 Stacks using arrays and linked implementation
4 Queues using arrays (linear and circular) and linked implementation
5 File (Binary and Text) operations (Creation, Updation, Query)
6 Any computational based problems

15 SQL commands along with the outputs based on any table/relation:

(**2 marks)**

5. **Viva Voce**

(**5 marks)**

Viva will be asked from the syllabus covered in class 12 and the project developed by the student.

GUIDELINES FOR PROJECTS

1. Preamble

1.1 The academic course in Computer Science includes one Project in each year. The purpose behind this is to consolidate the concepts and practices imparted during the course and to serve as a record of competence.

1.2 A group of two students/three students as team may be allowed to work on one project.

2. Project content

2.1 Project for class 12 should ensure the coverage of following areas of curriculum:

a. Problem Solving
b. Data Structures

c. Object Oriented Programming in C+ +
d. Data File Handling

The theme of the project can be

1 Any subsystem of a System Software or Tool.
2 Any Scientific or a fairly complex algorithmic situation.
3 Business oriented problems like Banking, Library information system, Hotel or Hospital management system, Transport query system.
4 Quizzes/Games.
5 Tutor/Computer Aided Learning Systems.

2.2 The aim of the project is to highlight the abilities of algorithmic formulation, modular programming, optimized code preparation, systematic documentation and other associated aspects of software development.

1.3 The assessment would be through the project demonstration and the Project Report, which should portray Programming Style, Structured Design,

2.4 Minimum coupling, high cohesion, good documentation of the code to ensure readability and ease of maintenance.

Problem Solving and Programming in C+ +

Note: Prior knowledge of C is not required in the learning of C+ +, even though references about C are made in some of the books.

1. Robert Lafore, OBJECT ORIENTED PROGRAMMING IN TURBO C+ +, Galgotia Publications Pvt. Ltd.
2. David Parsons, OBJECT ORIENTED PROGRAMMING WITH C+ +, BPB Publications.
3. Bjarne Stroustrup, THE C+ + PROGRAMMING LANGUGE, Adison Wesley.
4. Al Stevens, TEACH YOURSELF C+ + TECHNIQUES & APPLICATIONS, BPB Publications.
5. Scott Robert Ladd, TURBO C+ + TECHNIQUES & APPLICATIONS, BPB Publications.

Operating Environment

1. Ritchi, OPERATING SYSTEMS, BPB Publications.
2. James L. Peterson & Abraham S., OPERATING SYSTEMS, Addison–Wesley Publishing Company.

Data Structures

1. M.A. Weiss, Data Structures and Algorithm Analysis in C+ +. The Benjamin/ Cummings Pub. Co., Inc.
2. Scott Robert Ladd, C+ + COMPONENTS AND ALGORITHMS, BPB Publications.

Database Management System and SQL

1. Martin Gruber, UNDERSTANDING SQL, BPB Publications.
2. Sheldon M. Dunn x Base Cross Reference Handbook, First Authorised Asian Edition 93, Tech. Publications Pvt. Ltd.
3. C.J. Data, DATABASE PRIMER, Addison Wesley.

Computer Networks

1. A.S. Tanenbaum, Computer Network 4th Edition, Prentice Hall of India P.Ltd.
2. Williams Stalling, Data Communication and Networks 5th Edition, Prentice Hall of India P. Ltd.

3. Hancock, Network Concept and Architectures, BPB Publications.

Reference Magazines
PC WORLD, COMPUTERS TODAY, PC QUEST, DATA QUEST, COMPUTER WORLD.

Reference Manuals
OPERATING SYSTEM MANUAL, C+ + COMPILER MANUAL

Recommended books:

1. *Computer Science*
   CBSE XII
   by Preeti Gehlot & Charu Gupta (Oxford)
2. *Computer Science*
   for class XII
   by Dheeraj Mehrotra (S.Chand)

INFORMATICS PRACTICES

Objectives:

1 To understand the application development environment.
2 To develop programming skills in GUI programming and database creation in RDBMS.
3 To design, program and develop database applications using GUI programming tool and RDBMS.
4 To learn database connectivity using Visual Basic as front-end tool.
5 To develop ability to use the Open Source technology.

CLASS - 11
INFORMATICS PRACTICES (Theory)

Unit-wise weightage

Theory Paper **Time: 3 Hrs.**
Marks: 70

Units		**Periods**	**Marks**
I.	Computer System and Business Applications	30	10
II.	Introduction to Programming	80	30
III.	Relational Database Management System	70	30
	Total	**180**	**70**

UNIT I: COMPUTER SYSTEM AND BUSINESS APPLICATIONS

30 periods (10 Marks)

Evolution of computers; Basics of computer and its operation: Functional Components and their inter-connections, concept of Booting;
Hardware concepts:
Diagram illustrating main parts of computers;
Central Processing Unit (CPU): Arithmetic Logic Unit (ALU), Control Unit, Memory Unit (RAM - Random Access Memory & ROM - Read Only Memory)
Input devices: Keyboard, Mouse, Light pen, Touch Screens, Graphics Tablets, Joystick, Mic, MICR, OCR, Scanner, Smart Card reader, Barcode reader, Biometric sensor, web camera, digital camera;
Output Devices: Monitor/Visual Display Unit (VDU), Printer (Dot Matrix Printer, Desk jet/ Ink jet/ Bubble jet Printer, Laser Printer), Plotter, Speaker,
Secondary Storage Devices: Floppy Disk, Hard Disk, Compact Disk, Magnetic Tape, Digital Video Disk (DVD), Zip Drive; Units of Memory: Bit (Binary Digit), Byte, Kilobyte, Megabyte, Gigabyte.
Software Concepts:
Types of Software: System Software, Utility Software and Application Software.
System Software: Operating System, Language Compilers, Interpreters and Assembler; Operating System: Need of operating systems, Functions of Operating System Types of operating system.

Utility Software: Compression tools, Anti Virus, File Management tools and Disk Management tools; Application Software as a tool: Word Processor, Presentation Tool, Spreadsheet Package, Database Management System; Business software (for example: Inventory Management System, Payroll System, Financial Accounting, Hotel Management, and Reservation System);

Documentation

Purpose of using word processing software, opening a new/existing document, closing a document, typing in a document, saving a document, print preview, printing a document, setting up of page as per the specifications, selecting a portion of document, copying selected text, cutting selected text, pasting selected text; changing font, size, style, color of text; Inserting symbol; Formatting: Alignment – Left, Right, Center; Justification;
Industries and Business Computing: Types of Industries (Production, Shipping, Travel, Hotel, Insurance, Construction, Automobile), Applications of Business Computing in Industries.

UNIT II: INTRODUCTION TO PROGRAMMING 80 periods (30 marks)

Programming Methodology:

General Concepts; Modular approach; Stylistic Guidelines: Clarity and Simplicity of Expressions, Names, Comments, Indentation; Documentation and Program Maintenance; Running and Debugging programs, Syntax Errors, Run-Time Errors, Logical Errors;

Programming Tool: Visual Basic

Introduction to Programming – Modular Programming, Object Oriented Programming, Event Driven Programming;
About Visual Basic (Object Based Programming Language), Rapid Application Development using Visual Basic; Concept of Project in Visual Basic, VB Project

Options- Standard EXE, ActiveX DLL, ActiveX EXE, ActiveX Control, ActiveX Document DLL, ActiveX Document EXE, Addin, VB Application Wizard, IIS Application, DHTML Application;
Getting Familiar with Visual Basic User Interface - Pull-Down menus, Toolbar, Toolbox, Project Explorer, Properties Window, Form Layout window, Form, Immediate window;
Opening and Closing windows, Resizing and moving windows, Docking windows; Quitting Visual Basic;
Visual Basic Tool Box (Standard Window Controls) - Pointer, Picture Box, Label, Text Box, Frame, Command Button, Check Box, Option Button, Combo Box, List Box, Horizontal Scrollbar, Vertical Scrollbar, Timer, Drive List box, Directory List box, File List box, Shape, Line, Image, Data, OLE; Object Naming Conventions, Event Procedures;

Programming Fundamentals
Data Types: Integer, Long, Single, Double, Currency, String, Byte, Boolean, Date, Object, Variant;
Variables: Need to use variable, Declaring Variables, Variable Naming Convention, Assigning value to Variables, Data Types of variable, Scope and lifetime of Variables (Public and Private);
Control Structures:
Decision Structure: IF, IF-THEN-ELSE, Select Case;
Looping Structure: Do While…Loop, Do…Loop While, For…Next, For Each…Next;
Menu Editor: Concept of Menus, Shortcut menus and Popup menus, Designing Menu System, Menu Editor Dialog Box Options (Name, Index, Shortcut, HelpContextID,

NegotiatePosition, Checked, Enabled, Visible, WindowList, Right Arrow, Left Arrow, Up Arrow, Down Arrow, Menu List, Next, Insert, Delete, OK, Cancel), To Create Menu Controls in the Menu Editor, Menu Naming Conventions, Setting the Name Property, Creating a Menu Control Array, Creating Sub Menus, Separating Menu Controls, Assigning Access Keys and Shortcut Keys, Controlling Menus at Runtime-Enabling and Disabling Menu Commands, Displaying a Checkmark on a Menu Control, Making a Menu Control Invisible, Adding Menu Control at Runtime, Displaying Pop-Up Menu;
General Controls (Advance): Image List, Common Dialog Box, ADO DC, DB Combo, Media Player Control, DB Grid;
Adding a Toolbar: Creating an Image List, Adding Images to the Toolbar, To Add Code for the Toolbar Buttons;
Adding Status Bar: Adding Status Bar panels, Adding Time on the panel.
Dialog Boxes: Pre-defined dialog box, Custom dialog box;

UNIT III: RELATIONAL DATABASE MANAGEMENT SYSTEM 70 periods (30 marks)
Database Management System
Introduction to database concepts: relation/Table, attribute, Tuple/Rows, field, Data, Concept of String, Number and Date values, Data type and Data Integrity (Domain and Referential Integrity). Candidate key, Alternate key, Primary Key, Foreign Keys; Data Normalization-first, second, third, BCNF normal form;
Examples of Commercially available Database Management System's (Back-End) – Oracle, MS-SQL Server, DB2, MySQL, Sybase, INGRES.
Examples of Front End Software: Oracle Developer, Visual Basic, Visual C++, Power

Builder, Delphi;

RDBMS Tool:
Interface with Oracle, Login Screen, Entering Name and Password; Classification of SQL Statements: DML (SELECT, INSERT, UPDATE, DELETE), DDL (CREATE, DROP, ALTER, RENAME, TRUNCATE), DCL (GRANT, REVOKE), TCL (COMMIT, ROLLBACK); SQL SELECT Statement: SQL SELECT statement, Selecting All the Columns, Selecting Specific Column, Column Heading Default, Using Arithmetic Operators, Operator Precedence, Significance of NULL value, NULL values in Arithmetic Expressions, Defining and using Column Alias, Concatenation Operator (||), Duplicate rows and their Elimination (DISTINCT keyword), Role of SQL and SQL*Plus in interacting with RDBMS, Displaying Table Structure (DESC command);

SELECT Statement Continued: Limiting Rows during selection (using WHERE clause), Working with Character Strings and Dates, Using Comparison operators, BETWEEN Operator, IN Operator, LIKE Operator, IS NULL Comparison, Logical Operators, Use of Logical Operators (AND/OR/NOT Operators), Logical Operator Precedence, ORDER BY Clause, Sorting in Ascending/Descending Order, Sorting By Column Alias Name, Sorting On Multiple Columns;

Functions: SQL Functions, Types of SQL Function (Single Row/Multiple Row), Single Row SQL Functions, Character Functions (Case Conversion/Character Manipulation), Case Conversion Functions (lower (), InitCap (), UPPER ()) Character Manipulation Function

(CONCAT(), NSTR(), LENGTH(), TRIM(), SUBSTR(), LPAD()), Number Functions (ROUND(), TRUNC(), MOD()), Working with Dates (LAST_DAY(), MONTHS_BETWEEN(), NEXT_DAY(), ADD_MONTHS(), ROUND(), TRUNC()) Arithmetic Operation on Dates, Date Functions and their Usage, Data type Conversion Functions, Implicit and Explicit Conversion, TO_CHAR Function with Dates, TO_CHAR Function For Numbers, TO_NUMBER and TO_DATE Functions, NVL Function and its Usage, DECODE Function and its Usage;
Grouping Records: Concept of Grouping Records and Nested Grouping, Nested Grouping of records, Group Functions, Types of group functions (MAX(), MIN(), AVG(), SUM(), COUNT()), Using AVG and SUM Functions, Using MIN and MAX Functions, Using the COUNT Function, using COUNT(*), DISTINCT clause with COUNT, Group Functions and Null Values, Using NVL Function with Group Functions, Grouping Records: Group By Clause, Grouping By More than One Column, Illegal Queries with Group By Clause, Excluding Group Results: Having Clause, Nesting Group Functions,

Sub Queries: Concept of Sub-Query, Sub Query to Solve a Problem, Guidelines for Using Sub Queries, Types of Sub-Queries (Single Row and Multiple Row) and (Single Column and Multiple Column); Single Row Sub-Query and its Execution; Displaying Data From Multiple Tables: Concept of Join, Result of Join, Cartesian Product and Generating Cartesian Product example using Mathematical Set), Types Of Joins (EQUI, SELF, NON-EQUI, OUTER (LEFT and RIGHT)), Equi-join: Retrieving

Records with Equi-join, Additional Search Conditions using AND operator, Short Naming Convention for Tables (Table Aliases), Non-Equi join and its

Implementation, Outer-Join and Its Usage, Self-Join (Joining a table to Itself);

Manipulating Data of A Table/Relation: Concept of DML (Data Manipulation Language), INSERT Statement, Inserting New Rows, Inserting New Rows with Null Values, Inserting Date Values, Use of Substitution Variable to Insert Values, Copying Rows From Another Table, Update Statement to Change Existing Data of a Table, Updating Rows In A Table, Updating Rows Based on Another Table, Delete statement/ Removing Row/Rows from a Table, Deleting Rows Based on condition from another Table; Making Data Manipulation Permanent (COMMIT). Undo Data Manipulation Changes (ROLLBACK)

Database Objects: View, Table, Sequence, index, and Synonyms, DDL (Data Definition Language), Naming Convention, Creating Views, Creating Synonyms, Simple Views and Complex Views, Retrieving Data From a View, Querying a View, Modifying a View.

Including Constraints: Constraints, Concept of using Constraints, Constraint Guidelines, Defining Constraints, NOT NULL, UNIQUE KEY, PRIMARY KEY, FOREIGN KEY, FOREIGN KEY Constraint Keywords, CHECK, Adding a Constraint, Dropping a Constraint, Disabling Constraints, Enabling Constraints, Viewing Constraints, Viewing The Columns, Associated with Constraints;
Creation of a Table/Relation: CREATE TABLE Statement, Data types, The DEFAULT option, Creating Tables, Referencing Another User's Tables, Querying the Database Dictionary to view all tables in the Oracle Database, Creating a Table by Using a Sub-Query;

Managing Existing Tables and other Database Objects: The ALTER TABLE Statement, Adding a New Column in a Table, Modifying Existing Column, Dropping a Column, Renaming an Object, Truncating a Table, Adding Comments to a Table, Dropping Views, Dropping Synonyms, Dropping Tables; giving permission to other users to work on Created Tables and Revoking it (GRANT and REVOKE statement).

CLASS - 11
INFORMATICS PRACTICES (Practical)

Practical Paper **Time: 3Hrs** **Marks: 30**

Units		**Marks**
I. Hands-on Experience		15
II. Practical file		5
III. Project		5
IV. Viva Voce		5
Total		**30**

1. Hands-on Experience **(15 marks)**

A problem should be given covering the following

1 Table definition (The table must include constraints).
2 A form with Label, Text, Command Button control, List Box, Drive List Box, Directory List Box, File List Box, Tool and Menu Bar (Any 4).
3 DSN to access tables in the database.
4 For data connectivity (ActiveX Database Control).

5 Change of Text box Control Properties to view Database fields.

2. Practical File **(5 marks)**

The practical file should contain print outs from each of the following topics.

1. Create an application using Visual Basic with a Text Box control to accept a name from the user and print "Hello <Name>" in a message box. E.g. when user types his name as "Kamal Kant" in the text box and clicks OK button, a message "Hello Kamal Kant should be displayed and if he clicks on Cancel button a message as "Bye Kamal Kant" should appear.
2. Create an Application having two Text Boxes on the Window. Get Title, First Name and Last Name in it. On clicking Ok button a message should appear by joining Title + First Name + Last Name. e.g. if user enters Prof. in Title, Rajyash in First Name, and Swami as Last Name then the message to be printed should be " Happy Deepawli Prof. Rajyash Swami".
3. Create an application to let user guess any number and click a Play button given on the form. On clicking the Play button the application will generate a random number. If the generated number is same as guessed by the user then display a message "You Win" otherwise display a message "You Lose".
3. Create an application to Display Image files kept in different folders in the system. The application should allow the user to navigate in the folders and list all Image Files

   (*.BMP, *.JPG) when ever a image file is selected it should get that picture displayed in an Image control.
5. Create an application having menu bar and tool bar to create a text file, navigate and open text files, edit text file and save changes made by the user.
6. Create a small application working as a general purpose calculator.(+, -, x, ÷)
7. SQL assignments (Minimum 5 tables and minimum 5 queries from each table):

1 Display all the records (all columns) from table Emp.
2 Display EmpNo and EName of all employees from table Emp.
3 Display Ename, Sal and Sal added with Comm from table Emp.
4 Display EName joined with Job with heading "Employee", Sal*12 as "Total Salary" from table Emp.
5 Display distinct Sal of employees from table Emp..
6 Show the Structure of table Dept
7 Write a query to display EName and Sal of Employees whose salary is greater than or equal to 3000 from table Emp.
8 Write a Query to display employee name, salary and department number who are not getting commission from table Emp.
9 Write a Query to display employee Number, name, sal and sal*12 as Annual Salary whose commission is not NULL from table Emp.
10 Write a Query to display employee name and salary of those employee who do not have their salary in the range of 1500 to 2000
11 Write a Query to display name, job, salary, and HireDate of employees who are hired between February 20, 1981, and May 1, 1981. Order the query in ascending order of HireDate.
12 Write a Query to display the name and hire date of all employees who were hired in 1982.

13 Write a Query to display the name, job title and salary of employees who do not have a manager.
14 Write a Query to display the name of employee whose name contains ‘A’ as third alphabet.
15 Write a Query to display the name of employee whose name contains ‘T’ as the last alphabet.
16 Write a Query to display the name of employee whose name contains ‘M’ as first alphabet ‘L’ as third alphabet.
17 Write a Query to display the name of employee who is having ‘L’ as any alphabet of the name.
18 Write a query to display the current system date.
19 Write a Query to display employee number, name, salary, salary increase by 15% expressed as a whole number. Label the column as New Salary.
20 Write a Query to display the employee’s name and salary review date, which is the date after six months of HireDate.
21 Write a Query to display the employee’s name and salary review date, which is the date after six months of HireDate in format of ‘Sunday, 7 SEP, 1981’.

22 For each employee display employee name and total number of weeks lapsed between HireDate and Today.
- For each employee, display employee name and total number of days lapsed between Hire Date and Today.

23 Create a query that produces display in the following format
<employee name> Earns $<salary> Monthly and working as <Job >
24 Write a query which displays the employee name with the first letter capitalized and all other letters lower case and length of there name string.
25 Write a Query to display the employee name and commission amount. If the employee does not earn commission, put “No Commission”.
26 Write a query to display the grade of all employees based on the value of the column job as per following scheme:

JOB	**GRADE**
PRESIDENT	A
MANAGER	B
ANALYST	C
SALESMAN	D
CLERK	E
NONE OFTHE ABOVE	O

1 Write a query to display the EName and DeptNo and DName for all employees using tables Emp and Dept.
2 Write a Query to display employee name, department name and location of all employees who have manager number between 7500 and 7900.
3 Write a Query to display the employee name, department number and all the employees that worked in the same department as a given employee.
4 Write a Query to display employee name and HireDate of employees who are employed after Employee ‘BLAKE’.
5 Write a Query to display employee number, name and manager’s name with their manager number.
6 Write a Query to Display the Sum, Average, Highest and Lowest salary of the

employees.

7 Write a Query to Display the Sum, Average, Highest and Lowest salary of the employees grouped by department number.
8 Write a Query to Display the Sum, Average, Highest and Lowest salary of the employees grouped by department number and sub-grouped by job.
9 Write a query to display the number of employee with same job.
10 Write a query to display the average of Highest and lowest salary of each department.
11 Write a query to display the difference of Highest and lowest salary of each department having maximum salary > 4000.
12 Write a query to display the employee name and job for all employee in the same department as 'ALLEN'· Write a query to display employee name and salary of those who either work in department 10 or have salary greater than employee 7521.

Before the following exercise, please ensure that you are provided with a table Employee with following description

Table: Employee

Name of Column	Type	Length
ID	NUMBER	(4)
First_Name	VARCHAR2	(30)
Last_Name	VARCHAR2	(30)
User_ID	VARCHAR2	(10)
Salary	NUMBER	(9,2)

1 Use DESCRIBE command to ensure the table structure.
2 Add the following data in the above table as instructed

ID	First_Name	Last_Name	User_ID	Salary
1	Dim	Joseph	jdim	5000
2	Jagannath	Mishra	jnmishra	4000
3	Siddharth	Mishra	smishra	8000
4	Shankar	Giri	sgiri	7000
5	Gautam	Buddha	bgautam	2000

1 Populate table with first record mentioning the column list in the insert clause.
2 Populate table with next two records without mentioning the column list in the insert clause.
3 Populate table with 4th record and enter only ID and First_Name.
4 Populate table with 5th record and enter ID, User_ID, and Last_Name only.
5 For record with ID = 4 update record with Last_Name User_ID and Salary.
6 For record with ID = 5 update records with First_Name and Salary.
7 Make the changes permanent.
8 Modify the Last_Name, of the employee 3, to Gautam.
9 Modify the Salary and increase it by 1000, for all who get salary less then 5000.
10 Delete the employee record having First_Name as Siddharth.
11 Make the changes permanent.
12 Remove the entire contents of the table.
13 Undo the above step.

14 Create a table Employee1 with columns ID, First_Name and Dept_ID from table Employee and also confirm the existence of table Employee1.
15 Create a view VU_Emp1 which should include column EmpNo, EName and DeptNo from the table Emp.
16 Create a view VU_Emp2 which should include column EmpNo, EName and DeptNo from the table Emp and change the column headings as EmpNumber, Employee, Department.
17 Select VIEW_NAME and TEXT from the data dictionary USER_VIEWS.
18 Create the table Department based on the following table instance chart

Column Name	ID	Name
Datatype	NUMBER	VARCHAR2
Length	8	25

19 Populate the table Department with data from table dept. including only required columns.

20 Create the table Employee based on the following table instance chart.

Column Name	ID	First_Name	First_Name	Dept_ID
Datatype	NUMBER	VARCHAR2	VARCHAR2	NUMBER
Length	8	25	25	8

1 Rename table Employee1 to Employee2.
2 Drop table Employee2.
3 Drop table Employee and Department
4 Create table Customer as per following Table Instance Chart.

Column Name	Cust_ID	Cust_Name	Cust_Add1	Cust_Add2	Pincode	Cust_Phone
Key Type						
Nulls/Unique						
Fk Table						
Fk Column						
Datatype	number	varchar2	varchar2	varchar2	number	varchar2
Length	7	30	20	30	6	10

1 Add one column Email of data type VARCHAR2 and size 30 to the table Customer.

2 Change the data type of column pincode to VARCHAR2(10) in the table Customer.

3 Add one more column CustomerIncomeGroup of datatype VARCHAR2(10).

4 Insert few records with relevant information, in the table.

5 Drop the column CustomerIncomeGroup from table Customer.

6 Create table Department as per following Table Instance Chart.

Column Name	EmpID	DeptName	DeptLocation
Key Type	Primary		
Nulls/Unique		NOT NULL	
Fk Table			
Fk Column			
Datatype	NUMBER	VARCHAR2	VARCHAR2
Length	2	20	20

1 Create table Employee as per following Table Instance Chart.

Column Name	EmpID	EmpName	EmpAdd	Phone	EmpSal	DeptID
Key Type	Primary Foreign					
Nulls/Unique		NOT NULL				
Fk Table						Department
Fk Column						Dept_ID
Datatype	number	varchar2	varchar2	varchar2	number	varchar2
Length	6	20	30	10	9,2	2

7 Create table Employee1 as per the above Table Instance Chart but now use table level primary key addition method.
8 Create table Employee2 as per the above Table Instance Chart without any constraint while table creation.
9 Add a PRIMARY KEY constraint to the table Employee2 using the EmpID column.
10 Add a FOREIGN KEY reference on the Employee2 table that will ensure that employee records with nonexistent departments are to be prohibited.
11 Confirm that constraints were added by querying Constraint_Name and Constraint from USER_CONSTRAINTS relation.
12 Add a NOT NULL constraint to the table Emploee2 on column EmpName.
13 Add a CHECK constraint to ensure, at the time of record insertion, that employee records with salary less than 2000 are to be prohibited.
14 Disable NOT NULL Constraint on the column EmpName from the table Employee2
15 Drop UNIQUE constraint from the column DeptName in table Department.

8. Create an application to list all the contents of a database table using a data control object in visual basic.
9. Create an Application in Visual Basic having Menu Bar tool bar and other controls to View, Add and Modify records present in the Database Tables.

3. Project

(5

marks)

The following case study is to be used to develop a team project.
A cable company in Delhi is working since 1998. They have about 2 Lac customers in different zones (North, South, East, and West). Company wants to computerise its working, which involves Customer Registration, Customer Billing, and Bill Collection on monthly basis.

Develop a Database Handling Software for the company. The software should have option to enter customer data and information of bill collection. The data entry form should also have option to navigate through the records.
The software should allow to store following information of customer and billing (Normalize this to store data in tabular form).

Customer Name
Customer Address
Customer City
Customer Zone
Customer Pin Code
Customer Phone
Customer Interest (Movies, Games etc)
Customer Monthly Income
Customer Monthly Installment
Customer Joining Date
Bill Cycle
Bill Collection Date
(Suitable assumptions can be made)

The user interfaces should be designed in visual basic and must be user friendly with correct tab order.
Note: Similar type of cases can also be encouraged, provided it should include almost every aspect of course undertaken.

4. Viva Voce **(5 marks)**

Five questions from topics covered in the syllabus

NOTE : No question paper for practical work will be set by the Board.

Recommended book:

1. *Informatics Practices*
   by Sangeeta Panchal & Alka Sabharwal
   Oxford University Press,
   Pragiyotish Apartment, (1st Floor), M. Tayabulla Road,
   Dighalipukhuri Guwahati – 781001.

2. *Informatice Practices*
   by Sumita Arora
   Dhanpat Rai & Co.(P) Ltd.
   1682, 1710, Nai Sarak, Delhi – 110006

CLASS - 12
INFORMATICS PRACTICES (Theory)

Unit-wise weightage

Theory Paper **Time: 3 Hrs.**
Marks: 70

Units		Periods	Marks
VII.	I. Business Computing	30	10
VIII.	II. Programming	80	30
IX.	III. Relational Database Management System	70	30
Total		**180**	**70**

UNIT 1: BUSINESS COMPUTING **30 periods**
(10 marks)

Introduction to Open Source based software:
Terminology: OSS, FLOSS, GNU, FSF, OSI, W3C.
Definitions: Open Source Software, Freeware, Shareware, Proprietary software, Localisation, UNICODE
Softwares: Linux, Mozilla web browser, Apache server, MySQL, Postgres, Pango, OpenOffice, Tomcat, PHP, Python
Websites: www.sourceforge.net, www.openrdf.org, www.opensource.org, www.linux.com, www.linuxindia.net, www.gnu.org.
General concepts, User interfaces (Front End), Underlying Database (Back End), Integration of User Interface and Database;
More application areas of Databases:
Inventory control, Financial Accounting, Pay-Accounting System, Invoicing Management System, Personal Management System / HRD System, Fees Management system, Result Analysis System, Admission Management System, Income Tax Management System;
Advanced Program Development Methodology: System Development Life Cycle, Relational Database Concept, Relational Database, Management System, Data Models (Entity Relationship Model), Entity and Entity Set, Attributes (Single, Composite and Multi-Valued), Relationship (One-to-One, One-to-Many and Many-to-Many), Entity Relationship Modeling Conventions, Communicating with an RDBMS using SQL, Relational Database Management System, SQL Statements, About programming language in SQL.
Data Dictionary, Data Warehousing, Data Mining, Meta Data;
Object Modeling: Introduction to object oriented modeling using Unified Modeling Language (Concepts only).
Client Server Computing: Concept of Client Server Computing.

UNIT 2: PROGRAMMING: Visual Basic **80 periods**
(30 marks)

Programming Fundamentals

Modules: Modules in Visual Basic- Form Modules, Standard Modules, and Class Modules; Procedures: Procedures (General, Event, Function, Property);

Functions: Concept of Functions, Defining and Use of User Defined functions, function to perform calculations, Parameterized Functions;
Library Functions (System Functions)

String Functions: Space( ), Str( ), Right( ), Left( ), Mid( ), InStr( ), Len( ), Ltrim( ), Rtrim( ), Ucase(), Lcase( ), String( );
Numeric Functions: Sgn( ), Val( ), Int( );
Time-Related Functions: Now( ), Time( ), Minute( ), Month( );

Miscellaneous Functions: MsgBox( ), InputBox( );
Types of forms: Single Document Interface (SDI) and Multiple Document Interface (MDI);
MDI Applications: Creating MDI form and Child form, Arranging Child Forms**;**
Accessing database from ORACLE using ODBC or ADO or OLEDB to connect with database.
Data Control: Accessing Data with the Data Control, Using Data-Aware Controls, Using Data Control Properties: Database Name, Exclusive, Options, Read Only, Record Source, Data Control Methods: Refresh, UpdateControls, UpdateRecord; Bound Controls: Adding Bound Text and Bound Label Controls. Data-Bound list Boxes, Grids, and Sub-Forms
ADO (ActiveX Data Objects)**:** Connection Object, Command Object, and RecordSet Object, Special ADO Properties: Connection String (using single table), Command Text, Command Types, Cursor Locations, Cursor Types, Lock Types, Mode Types.
ADO Data Control: Simple Data linking using ADO Data Control Methods, ADO Data Control Events.

UNIT 3: RELATIONAL DATABASE MANAGEMENT SYSTEM

70 periods (30 marks)

Database Fundamentals

Concept of Database Transaction, Committing a Transaction, Concept of "All or None" in a Transaction, Network Protocols Required (TCP/IP) for Data Communication, Stored Procedures, Concept of Database Fragmentation and Distributed Databases.

PL/SQL (Programming Language in SQL)

Importance of Writing Procedures, Declaring Variables: About PL/SQL, PL/SQL Block Structure, Program Constructs, Use of Variables, Handling Variables in PL/SQL, Types of Variables, Declaration, Naming Rules, Assigning Values to Variables, Initialization, and Keywords, Scalar Data types, Base Scalar Data Types, Scalar Variable Declaration, %TYPE attribute: for variable declaration, Declaring Boolean Variables, PL/SQL Record Structure, Referencing Non-PL/SQL variables, DBMS_OUTPUT.PUT_LINE;

Writing Executable Statements: PL/SQL Block Syntax and Guidelines, SQL functions in Code, SQL Functions in PL/SQL, PL/SQL Functions, Data type Conversion, Nested Blocks and Variable Scope, Operators in PL/SQL, Using Bind Variables, Programming Guidelines, Determining Variable Scope, SQL Statements in PL/SQL, Retrieving data in PL/SQL, Manipulating Data using PL/SQL, Inserting Data, Updating Data, Deleting Data, Naming Conventions, Commit and Rollback Statements, SQL Cursor, and Cursor Attributes;
Writing Control Structures: Controlling PL/SQL Flow of Execution, IF statements, IFTHENELSE Statement Execution Flow, IF-THEN-ELSIF Statement Execution Flow, Building Logical Conditions, Logic Tables, Boolean Conditions, Iterative Control: LOOP Statement, Basic Loop, FOR Loop, While Loop;

Creating Procedures: Overview of Procedures, Syntax for Creating Procedures, Developing Stored Procedures and its Advantages, Creating a Stored Procedure, Procedure Parameter Modes, Creating Procedures with Parameters, IN and OUT

parameters and Usage, DEFAULT Option for Parameters, Removing Stored Procedures;
Writing Cursors: Introduction to Cursors (Implicit and Explicit), Explicit Cursor Functions, Controlling Explicit Cursors, Declaring, Opening and Closing the Cursor,

Triggers: Types of Triggers: Row-Level Triggers, Statement Level Triggers, BEFORE and AFTER Triggers, INSTEAD of Triggers, Valid Trigger Type, Trigger Syntax, Combining Trigger Types, Enabling and Disabling Trigger, Replacing Trigger, Dropping a Trigger.

Development of Data Base Applications (Application Domain): Student database for school, Employee database for a company, Library Database for Library Student database management system for school, Employee database management system for a company, Library Database management system for Library, Railway Reservation System, Hotel Reservation, Inventory Control System;

CLASS - 12
INFORMATICS PRACTICES (Practical)

Practical Paper **Time: 3 Hrs**
Marks: 30

Units		**Marks**
I. Handson Experience		15
II. Practical file		5
III. Project		5
IV. Viva Voce		5
Total		**30**

1. Hands on experience
(15 marks)

A problem should be given covering the following features:

1. Start a Standard Exe Project and it should contain MDI form with Menu Bar and Tool Bar (with Images)
2. Table structure in the database for the application with Constraints (Primary Key, Foreign Key, Check, and Unique).
3. A New Form to place an ADO component on it, for accessing data in table Stored Procedure to perform transactions/ conditional update
4. Trigger (any)
5. Making executable files of the project.

2. Practical File
(5 marks)

The practical file should contain print outs from each of the following topics:

1. Create an Application using Visual Basic for Students Information System Having a Student Table in Relational Database and a Student Data Form in Visual Basic to enter data into the database.

2. Create an Application using Visual Basic for Criminals Information System Having a Criminal Table in Relational Database and a Criminals Data Entry Form in Visual Basic to enter data into the database. The Data entry form should contain form level and Field level checks using procedures.
3. Create an Application using Visual Basic for Nursing Home Automation System having Linked tables (for example: Patient, Employee, Bill) in

Relational Database and a required Data Entry Forms in Visual Basic to enter data into the database. The Data entry form should contain form level and Field level checks using procedures. Use of Bound Controls and Sub-Forms are to be encouraged in this application.

4. Create a database handling application for Student Expert System. Following features are to be incorporated in the application:

a. Create following linked tables of Student in the Relational Database.
   i. StudentMaster : containing general information about the student.
   ii. StudentDetail: Table to store data having details such as Class, Section, Marks and other relevant information.
   iii. StudentFeeDetail: Should contain details like Financial Year, Class, Fee, FeeStatus(such as Paid and UnPaid)
   iv. Accounts: General Accounts table to store fee collection details such as received from, date, chequeno and other relevant information.

b. The database should have Procedures to update data, Insert data and to perform other database transactions.

c. Database triggers should also be defined wherever automatic data modification is required.

d. Visual Basic forms for data entry.

e. Procedures in Visual Basic to perform Database Transactions and Commit changes made

f. Reporting tool to make the MIS reports, required to analyse data entry.

3. Project **(5 marks)**

The following case study is to be adopted for the development of project:

A book publishing company B R Publishing Group is in existence since1950. They were untouched with latest technological inventions. They are still using a traditional approach of bookkeeping and accounts maintenance.

A company, Nova technology, introduced themselves as system integrator and developers who can change existing working system into the latest concept of
paper less office. They wanted few details from the company about its working. The details are as under:

- Name of the company is B R Publishing Group.

1 The company is having 20 employees. One Managing Director, Two Managers (Work manager and Marketing Manager) and 17 employees who work as a team for book publishing.

2 The company publishes books in different Indian languages and different topics.

3 Every book involves an Author and its detail.

4 The book is sold in the market at a variable discount options

5 Book Seller: 30%

6 Schools: 20%

7 Customer: 15%

8 The company is maintaining information about Author and all its details such

as Personal Information, Royalty etc.

9 The company manages information about the book such as Book Name, Author, Quantity Sold, Quantity in Stock, etc.

10 The company maintains Customer (Book Sellers) information. Books Sold, Subject, Language, and Amount Pending etc.

11 Reports are required at different levels, such as

12 Customer Listing

13 Book Listing

14 Language Wise Book Listing

15 Topic Wise Book Listing

16 Pending Amount Listing (Customer Wise, Book Wise)

17 Author Royalty Detail

18 Bill Generation etc.

As a developer, you are required to design the project and develop it as per customer needs (Developer can also visit a publishing company to collect customer details and live data). Suitable assumptions can be made during implementation. A proper normalized database is to be maintained in the RDBMS and the front end is to be developed using advanced interface controls. User-friendly interface is to be generated.

Note: This is a sample case study. Similar type of cases can be developed on different application areas such as Library, Hospital, Transport Authority, Transporters, Wholesale Merchants, and Chemist Shops etc. The cases to be developed should preferably be obtained from live situations.

4. Viva Voce **(5 marks)**

Five questions from topics covered in the syllabus.

Recommended books:

1. *Informatics Practices*
   A Text book for Class 12
   by Sumita Arora (Dhanpat Rai & Co.)
2. *Informatics Practices*
   CBSE XII
   By Sangeeta Panchal and Alka Sabharwal (Oxford)

ACCOUNTANCY

Objectives:

1 To familiarize the students with accounting as an information system.

2 To acquaint the students with basic concepts of accounting and accounting standard.

3 To develop the skills of using accounting equation in processing business transactions.

4 To develop and understand about recording of business transactions and preparation of financial statements.

5 To enable the students with accounting for re-constitution of partnership firms.

6 To enable the students to understand and analyse the financial statements.

7 To familiarize students with the fundamentals of computerized system of accounting.

CLASS - 11
ACCOUNTANCY

Unit-wise weightage
Time: 3 Hrs.
Marks: 100

Units		Periods	Marks
Part A: Financial Accounting – I			
I.	Introduction to Accounting	10	7
II.	Theory Base of Accounting	10	7
III.	Recording of Business Transactions	20	16
IV.	Trial Balance and Rectification of Errors	20	8
V.	Depreciation, Provisions and Reserves	20	12
VI.	Accounting for Bills of Exchange Transactions	20	10
Part B: Financial Accounting - II			
VII.	Financial Statements	44	25
VIII.	Accounting from Incomplete Records	8	5
IX.	Computers in Accounting	14	6
X.	Accounting and Database System	14	4
	Total	**180**	**100**

Part A: Financial Accounting – I

Unit I: Introduction to Accounting **10 periods**
(7 marks)

Accounting – meaning, objectives, Accounting as source of information, internal and external users of Accounting information and their needs. Qualitative characteristics of Accounting information – reliability, relevance, understandabilities and comparability. Basic Accounting Terms – Assets, Liabilities, Capital, Expense, Income, Expenditure, Revenue, Debtors, Creditors, Goods, Cost, Gains, Stock, Purchases, Sales, Loss, Profit, Voucher, Discount, Transaction, Drawings, Receivables and Payables.

Unit II: Theory Base of Accounting **10 Periods**
(7 marks)

Process of Accounting – from recording of business transactions to preparation of trial balance. Bases of Accounting – Cash Basis and Accrual Basis.

Unit III: Recording of Business Transactions 20 periods (16 marks)

Vouchers and Transactions: Origin of Transactions – Source Documents and Vouchers, Preparation of Accounting vouchers; Accounting Equation Approach – Meaning and Analysis of transactions using Accounting Equation - Rules of Debit and Credit. Recording of Transactions: Books of original entry – Journal, Special Purpose Books; Simple column, Double column and Three column Cashbook. Petty Cashbook. Purchases Book, Sales Book, Purchases Returns Book, Sales Returns Book. Ledger - meaning, utility, format, posting from Journal and Subsidiary Books, Balancing of Accounts. Bank Reconciliation Statement - Meaning, Need and Preparation, corrected Cash Book Balance.

Unit IV:Trial Balance and Rectification of Errors 20 periods (8 marks)

Trial Balance: Meaning, objectives and preparation. Errors: Types of Errors-errors affecting Trial Balance, errors not affecting Trial Balance.

Unit V: Depreciation, Provisions and Reserves 20 periods (12 marks)

Depreciation - Meaning and need for charging depreciation, factors affecting depreciation, Methods of depreciation – Straight Line Method, Written Down Value Method (excluding change in Method), Methods of recording depreciation charging to assets account, creating provision for depreciation/accumulated depreciation account. Treatment of disposal of assets. Provisions and Reserves - Meaning, importance, difference between Provisions and Reserves, types of Reserves - Revenue Reserve, Capital Reserve, General Reserve, Specific Reserve and Secret Reserve.

Unit VI: Accounting for Bills of Exchange Transactions 20 periods (10 marks)

Bills of exchange and Promissory Note - definition, features, parties, specimen and distinction. Important Terms - Term of Bill, Accommodation Bill, Days of Grace, Date of Maturity, Bills at Sight, Negotiation, Endorsement, Discounting of Bills, Dishonour. Accounting treatment of trade bills.

Part B: Financial Accounting – II

Unit VII: Financial Statements 44 periods (25 marks)

Financial statements - Meaning. Distinction between Capital Expenditure and Revenue Expenditure. Trading and Profit and Loss Account - Gross

Profit, Operating Profit, Net Profit. Balance Sheet - need, grouping and marshalling of Assets and Liabilities, Vertical Presentation of Financial Statement. Adjustments in preparation of financial statements with respect to closing stock, outstanding expenses, prepaid expenses, accrued income, Income received in advance, depreciation and bad debts, provision for doubtful debts, provision for discount on debtors, manager's commission. Preparation of Trading and Profit & Loss Account and Balance Sheet of sole proprietorship.

Unit VIII: Accounts from incomplete records **8 periods**
(5 marks)

Incomplete records : meaning, uses and limitations. Ascertainment of profit/loss by statement of affairs method.

Unit IX:Computers in Accounting **14 periods**
(6 marks)

Introduction to Computer and Accounting Information System (AIS) Applications of computers in accounting - Automation of accounting process, designing accounting reports, MIS reporting, data exchange with other information systems. Comparison of accounting processes in manual and computerized accounting, highlighting advantages and limitations of automation.

Unit X: Accounting and Database System **14 periods**
(4 marks)

Accounting and Database Management System. Concept of entity and relationship: entities and relationships in an Accounting System: designing and creating simple tables, forms, queries and reports in the context of Accounting System.

Recommended book:

1. *Accountancy for class 11*
   by P.C. Tulsian, Ratna Sagar Ltd,
   Virat Bhavan, Commercial Complex,
   Mukherjee Nagar, Delhi – 110009

CLASS - 12
ACCOUNTANCY

Unit-wise Weightage
Time: 3 Hrs.
Marks: 100

Units	Periods	Marks
Part A : Accounting for not for Profit Organisations, Partnership Firms and Companies		
I. Accounting for not for Profit organisations	20	15
II. Accounting for Partnership Firms	10	5
III. Reconstitution of Partnership	30	15
IV. Accounting for Share Capital and Debenture	40	15
Part B: Financial Statement Analysis		
V. Analysis of Financial Statements	30	10
VI. Cash Flow Statement	30	10
Part C: Project work	20	30
1. Project File — 5 marks		

Unit I: Accounting for Not-For-Profit Organisations 20 periods (15 marks)

Not for profit organisation - Meaning and examples. Receipts and Payments: Meaning and concept of fund based accounting. Preparation of Income and Expenditure Account and Balance Sheet from Receipt and Payment Account with additional information.

Unit II: Accounting for Partnership firms 10 periods (5 marks)

Nature of Partnership firm: Partnership Deed-meaning, importance.
Partners' Capital Accounts:Fixed vs Fluctuating Capital, Division of Profit among partners, Profit and Loss Appropriation Account including past adjustments.

Unit III: Reconstitution of Partnership 30 periods (15 marks)

Changes in Profit Sharing Ratio among the existing partners-Sacrificing Ratio and Gaining Ratio. Accounting for Revaluation of Assets and Liabilities and distribution of reserves and Accumulated Profits.
Goodwill - Nature, Factors affecting and methods of valuation - Average profit, Super profit and Capitalisation methods.
Admission of a Partner - Effect of Admission of Partner, Change in Profit Sharing Ratio, Accounting Treatment for Goodwill (as per AS 10).
Revaluation of Assets and Liabilities, Reserves and Accumulated Profits and Adjustment of Capitals (Excluding Joint Life Policy).
Retirement/Death of a Partner: Change in Profit Sharing Ratio, Accounting treatment of Goodwill, Revaluation of Assets and Liabilities, Adjustment of Accumulated Profits (Reserves) and Capitals.

Unit IV: Accounting for Share Capital and Debenture 40 periods (15 marks)

Share Capital - Meaning, Nature and Types.
Accounting for share capital - Issue and Allotment of Equity and Preference Shares; Public subscription of shares; over subscription and under subscription; issue at par, premium and at discount; calls in advance, calls in arrears, issue of shares for consideration other than cash.
Forfeiture of shares - accounting treatment, re-issue of forfeited shares (simple problems).
Presentation of Share Capital and Debenture in Company’s Balance Sheet.
Issue of debentures-at par and premium; issue of debentures for consideration other than cash.
Redemption of debentures out of capital; redemption methods - lump sum payment, draw by lots, purchase in the open market and conversion (excluding cum-interest and ex-interest)(excluding practical).

Part B: Financial Statement Analysis

Unit V: Analysis of Financial Statements 30 periods (10 marks)

Financial Statements of a Company - preparation of simple balance sheet of a company in the prescribed form with major headings only.
Financial Statement Analysis - meaning, significance, limitations, Tools for

Financial Statement Analysis - Comparative Statements, Common Size Statements, Accounting Ratios: meaning and objectives, types of ratios:
Liquidity Ratios: Current Ratio, Liquid Ratio
Solvency Ratios: Debt to Equity, Total Assets to Debt, Proprietary Ratio.
Activity Ratios: Inventory Turnover, Debtors Turnover, Payables Turnover, Working Capital Turnover, Fixed Assets Turnover.
Profitability Ratios: Gross Profit, Operating Ratio, Net Profit Ratio, Return on Investment, Earning Per Share, Dividend per Share, Price Earning Ratio.

Unit VI: Cash Flow Statement **30 periods (10 marks)**

Cash Flow Statement - Meaning and objectives, preparation, adjustments related to depreciation, dividend and tax, sale and purchase of non-current assets (as per revised standard issued by ICAI) – AS-3.

Part C: Project work **20 periods (30 marks)**

1. Project File – 5 marks
2. Written Test – 20 marks
3. Viva Voce – 5 marks

1. Project File

Objectives:

1 To enable students to complete the accounting process in real business situations.
2 To develop the competence of reading Accounting data of business firms and interpret the information on the basis of given guidelines to present the desirable information in required format in Project File.

Guidelines for Teachers

During the academic session, the students will work on at least three types of problems, out of which one will be of comprehensive nature. The comprehensive problem will involve the students from the initial stage of accounting to the preparation and analysis of Financial Statements. The data provided will represent real life situations in a condensed form. The situations given in these problems will require a student to derive meaningful information for taking decisions for purpose of investment, expansion, financing, etc.

Two problems will be specific, relating to Ratio Analysis and Cash Flow Statement. The situations given in problems will require a student to analyse the information given in the Financial Statements.

The student is expected to analyse the facts and present the information in a meaningful manner for interpretation. The teachers are first expected to discuss these problems thoroughly with their students and encourage them to come out with solutions. Teachers are also expected to collect the annual reports of companies and formulate their own problems for discussion and Project Work.

The students will prepare a Project File to record their work, related to the problems attempted by them.

1. First page of the file should describe title of work, identity of student, school and the teacher concerned.
2. Index to indicate columns for title of work, page no., date, teacher's remarks and signature.
3. The format for Project File will be:

1 Problem details,
2 Facts of the problem,
2 Required information,
3 Steps to solve the problem,
4 Solution and presentation of information,
5 Analysis and interpretation of information.

Project File should be neatly handwritten or typed with page numbers. Each step of the solution needs to be highlighted. Conclusions drawn are placed in boxes.

Guidelines for Examiners

1. The Project File is to be evaluated. Marks to be awarded out of five marks.
2. The marks should be awarded based on:
   1 Context coverage
   2 Presentation
   2 Completeness and quality of work.

2. Written Test

Objectives:

1 To give them exposure to analyse the financial statements of business firms and help them to derive meaningful information there from.
2 To know how effectively the students have done the Project Work.

Guidelines for Teachers

The teacher will discuss with students all exercises given in the textbook and analyse the information given therein. They will identify relevant data required and work out solutions. The scope of cases will be restricted to Ratio Analysis and Cash Flow Statement.

Guidelines for Examiners

Students will be given 2 application oriented problems of 10 marks each, from Ratio Analysis and Cash Flow Statement. The problems will be set in consultation with the teacher. The external examiner will discuss with the teacher the quantum of projects completed during the year and set the problems accordingly. Marks will be awarded on the steps taken, data identified and solution arrived at.

3. Viva Voce

Objectives:

1 To test whether the students has understood topics covered and is able to express.
2 To test whether the Project File presented by the student is a work done by him/her.

Guidelines for Teachers

1. During the course of the academic year, the teacher must give thorough practice to the students on Viva Voce examination on each aspect of the Project File.
2. Wherever possible, the teacher may invite a colleague/expert from another school for asking questions. This will rehearse the students for the final

examination.

Guidelines for Examiners

The work done by students in Project File will form the basis of setting questions. The external examiner will ask 2, 3 questions to test the authenticity of the work done in the files.

Recommended books:

1. *Accountancy for class 12 Part A*
   by P.C. Tulsian, Ratna Sagar Ltd,
   Virat Bhavan, Commercial Complex,
   Mukherjee Nagar, Delhi – 110009.

2. *Accountancy for class 12 Part B*
   by P.C Tulsian, Ratna Sagar Ltd.
   Virat Bhavan, Commercial Complex,
   Mukherjee Nagar, Delhi – 110009.

BUSINESS STUDIES

Objectives:

1 To develop in students an understanding of the processes of business and its environment.

2 To acquaint students with the dynamic nature and inter-dependent aspects of business.

3 To develop an interest in the theory and practice of business, trade and industry.

4 To familiarize students with theoretical foundations of organizing, managing and handling operations of a business firm.

5 To help students appreciate the economic and social significance of business activity and the social cost and benefits arising therefrom.

6 To acquaint students with the practice of managing the operations and resources of business.

7 To prepare students to function more effectively and responsibly as consumers, employers, employees and citizens.

8 To help students in making the transition from school to the world of work including self-employment.

9 To develop in students a business attitude and skills to be precise and articulate.

CLASS - 11
BUSINESS STUDIES

Unit wise weightage
Time: 3 Hrs.
Marks: 100

Units		Periods	Marks
Part A: Foundations of Business			
I.	Nature and Purpose of Business	20	12
II.	Forms of Business Organizations	20	12
III.	Private, Public and Global Enterprises	18	10
IV.	Business Services	16	8
V.	Social Responsibility of Business and Business Ethics	16	8
Part B: Corporate Organization, Finance and Trade			
VI.	Formation of a Company	16	9
VII.	Sources of Business Finance	22	12
VIII.	Small Business	16	8
IX.	Internal Trade	20	12
X.	International Business	16	9
	Total	**180**	**100**

Part A: Foundations of Business

Unit I: Nature and Purpose of Business 20 periods (12 marks)

Concept and Characteristics of Business. Business, Profession and employment – distinctive features. Objectives of business – economic and social, role of profit in business. Classification of business activities: Industry and Commerce. Industry – types: Primary, Secondary and Tertiary. Commerce: Trade and Auxiliaries to trade. E-Business–Meaning, scope and benefits, Resources required for successful e- business implementation, On-line transactions, payment mechanism, security and safety of business transactions. Business risks – nature and causes.

Unit II : Forms of Business Organizations 20 periods (12 marks)

Sole Proprietorship and Joint Hindu Family Business – meaning, features, merits and limitations. Partnership - Meaning, types, registration, merits, limitations, types of partners. Co-operative Societies - Meaning, types, merits and limitations. Company: Private Ltd. Company, Public Company-merits and limitations. Choice of form of business organizations. Starting a business – Basic factors.

Unit III: Private, Public and Global Enterprises 18 periods

Unit IV : Business Services 16 periods (8 marks)

Nature and types of Business Services – Banking, Insurance, Transportation, Warehousing and Communication. Banking – types of Banks, functions of Commercial Banks and E-Banking. Insurance – Principles, types: Life Insurance, Fire Insurance and Marine Insurance. Postal and Telecom Services. Warehousing - types and functions.

Unit V: Social Responsibility of Business and Business Ethics 16 periods (8 marks)

Concept of Social responsibility. Case for social responsibility. Responsibility towards owners, investors, employees, consumers, Government and public in general. Business and environmental protection. Business ethics: concept and elements.

Part B: Corporate Organisation, Finance and Trade

Unit VI: Formation of a company 16 periods (9 marks)

Stages in the formation of a Company:
Promotion, Incorporation and Commencement of business.

Unit VII: Sources of Business Finance 22 periods (12 marks)

Nature and significance. Owner's funds and borrowed funds. Sources of raising finance: Equity and Preference shares. Global Depository Receipts and American Depository Receipts. Debentures and Bonds. Retained Profits. Public Deposits. Loans from Commercial Banks. Loans from financial institutions.

Unit VIII: Small Business 16 periods (8 marks)

Small Scale Industry, Tiny Sector, Cottage and Rural Industry. Role of small business in rural India. Problems of small business in India. Government Assistance and special schemes for industries in rural, backward and hilly areas.

Unit IX: Internal Trade 20 periods (12 marks)

Meaning and types of internal trade: wholesale and retail. Services of a wholesaler and a retailer.
Types of Retail Trade: Itinerant retailers and fixed shops. Departmental store, super market, mails, chain store, mail order business, consumer's co-operative store. Automatic Vending Machine.

Unit X: International Business 16 periods (9 marks)

Nature, importance and complexities involved in International Business. Ways of entering into international business: Export-Import Procedures and documentation. Foreign trade promotion; Organizational support and incentives; Nature and importance of Export processing zone/special economic zone.

Recommended book:

1. *Business Studies for Class 11*
   by P.C. Tulsian,
   Ratna Sagar Ltd.
   Virat Bhavan, Commercial Complex
   Mukherjee Nagar, Delhi – 110009.

CLASS - 12
BUSINESS STUDIES

Unit-wise weightage
Time: 3 Hrs. Marks: 100

Units	Periods	Marks
Part A: Principles and Functions of Management		
I. Nature and Significance of Management	14	10
II. Principles of Management	14	8
III. Planning	14	9
IV. Organising	18	10
V. Staffing	18	10
VI. Directing	22	12
VII. Controlling	14	7
Part B: Business Finance and Marketing		
VIII. Financial Management	20	12
IX. Marketing Management	30	14
X. Consumer Protection	16	8
Total	**180**	**100**

Part A: Principles and Functions of Management

Unit I: Nature and Significance of Management 14 periods (10 marks)

Management – Concept, objectives, importance. Nature of management; Management as science, art, profession. Levels of management – top, middle, supervisory (first level). Coordination – nature and importance.

Unit II: Principles of Management 14 periods (8 marks)

Principles of Management – Meaning, nature and significance.
Fayol's Principles of Management.
Taylor's Scientific Management – Principles and techniques.

Unit III: Planning 14 periods (9 marks)

Meaning, features, importance, limitations. Planning Process. Types of plans – Objectives, Strategy, Policy, Procedure, Method, Rule, Budget, Programme (meaning, importance/objectives).

Unit IV : Organising 18 periods (10 marks)

Meaning and importance. Steps in the process of organising. Structure of organization – functional and divisional. Formal and informal organization.

Unit V: Staffing 18 periods (10 marks)

Maslow's hierarchy of needs. Leadership - meaning, importance, qualities of a good leader. Communication – meaning and importance, formal and informal communication, barriers to effective communication.

Unit VII: Controlling 14 periods (7 marks)

Meaning and importance of controlling. Relationship between planning and controlling. Steps in the process of control.

Part B: Business Finance and Marketing

Unit VIII:Financial Management 20 periods (12 marks)

Meaning, role, objectives of financial management. Financial planning – meaning and importance. Capital structure – meaning and factors. Fixed and working capital – meaning and factors affecting its requirements.

Unit IX: Marketing Management 30 periods (14 marks)

Marketing – meaning, functions and role. Marketing mix – concept and elements. Product – nature, classification, branding, labelling and packaging. Physical distribution - meaning, role. Channels of distribution – meaning, types, factors determining choice of channels. Promotion – meaning and role, promotion mix, role of advertising and personal selling, sales promotion, objections to advertising. Price – factors influencing pricing.

Unit X : Consumer Protection 16 periods (8 marks)

Importance of Consumer protection. Consumer rights. Consumer responsibilities. Role of consumer organizations and NGO's.

Recommended boos:

1. *Tulsian's Business Studies for Class 12*
   by P.C. Tulsian, Ratna Sagar Ltd.
   Virat Bhavan, Commercial Complex,
   Mukherjee Nagar, Delhi – 110009.

FUNDAMENTALS OF BUSINESS MATHEMATICS

Objectives

The objectives of studying Fundamentals of Business Mathematics at Higher Secondary stage intend to help the students to:

1 acquire knowledge and critical understanding of basic facts, concepts, terms, principles, symbols, formulae and mastery of underlying processes and skills.

2 develop the ability to apply the knowledge and skills to solve problems.

3 develop positive attitude to think, analyze and articulate logically.

4 foster acquisition of the skills of:
   (a) computation,
   (b) drawing geometrical figures and graphs, and
   (c) reading tables, charts, graphs, etc.

5 develop interest in the subject by participating in related competitions.

6 develop necessary skills to work with modern technological devices such as calculators and computers.

CLASS 11
FUNDAMENTALS OF BUSINESS MATHEMATICS

Unit wise weightage

Time: 3 Hrs.
Marks: 100

Units	Periods	Marks
Part A : Business Mathematics		
I. Surds and Indices	18	10
II. Co-ordinate Geometry	18	10
III. Logarithms	16	10
IV. Permutations and Combinations	20	10
V. Binomial Theorem	18	10
Part B : Commercial Arithmetic		
VI. Simplification	18	10
VII. Simple Interest and Compound Interest	20	10
VIII. Annuities	16	10
IX. Proportional Parts and Percentages	16	10
X. Profit and Loss	20	10
Total	**180**	**100**

PART A: BUSINESS MATHEMATICS

Unit I: Surds and Indices **18 periods**
(10 marks)

Indices-Definition, Laws of Indices Surds-Definition, Similar Surds, Rationalization, Quadratic Mixed Surds and their properties.

Unit II: Co-ordinate Geometry **18 periods**
(10 marks)

Distance formula, Section formula (Internal and External), Area of a triangle, Slope/gradient of a straight line, Equation of a straight line, Applied problems in Business, Equation of a circle (Standard form/General form). Radius and center of a circle.

Unit III: Logarithms **16 periods**
(10 marks)

Introduction – meaning and definition, properties of Logarithms, systems of Logarithm, Characteristic and Mantissa, determination of

Applications of Permutations and Combinations.

Unit V: Binomial Theorem 18 periods (10 marks)

Statement of Binomial Theorem, General, independent and middle terms in Binomial expansions. Application of Binomial Theorem.

PART B: COMMERCIAL ARITHMETIC

Unit VI: Simplification 18 periods (10 marks)

Simplification, Square root, Approximation, Error in calculation – absolute, relative and percentage errors.

Unit VII: Simple Interest and Compound Interest 20 periods (10 marks)

Meaning of Interest, Simple Interest, Installment Buying, Compound Interest, Growth and Decay (Depreciation), Applied Logarithm.

Unit VIII: Annuities 16 periods (10 marks)

Meaning – Definition, Types of Annuities, Amount of an Annuity, Present value, Sinking Fund, Loan.

Unit IX: Proportional Parts and Percentages 16 periods (10 marks)

Principle of division into Proportional parts and related problems. Meaning of Percentages, Rules of Percentages and Applied problems in business.

Unit X: Profit and Loss 20 periods (10 marks)

Meaning of Profit and Loss, certain relevant terms viz. Selling Price, Cost Price, Market Price, Whole Sale Price, Retail Price, Turn over. Types of discount – Cash Discount, Trade Discount and Successive Discount.

Recommended Book:

i) Fundamentals of Business Mathematics for Class 11
by Ranjit Paul,
Amiya Prakashani,
Rangapara, Sonitpu, Assam – 784505.

CLASS - 12
FUNDAMENTALS OF BUSINESS MATHEMATICS

Unit wise weightage
Time: 3 Hrs.

Marks: 100

Units	Periods	Marks
Part A : Business Mathematics		
I. Sets	14	10
II. Number System	12	5
III. Relations and Functions	20	10
IV. Determinants	22	10
V. Matrices	22	15
Part B : Commercial Arithmetic		
VI. Partnership	16	10
VII. Bill of Exchange and Average Due Date	22	10

PART A: BUSINESS MATHEMATICS

Unit I: Sets **14 periods**
(10 marks)

Introduction – Meaning, Elements of a set, Description of a set, Types of set, Finite and Infinite Sets, Empty Sets, Equality of sets, Equivalent Sets, Sub-sets, Family of sets, Power Sets, Universal Sets, Venn Diagram, Complements of sets, Operations on sets (Union, Intersection and difference of two sets), Application of sets.

Unit II: Number System **12 periods**
(5 marks)

Natural Numbers, Integers, Rational Numbers, Irrational Numbers, Real Numbers, Inequalities, Some properties.

Unit III: Relations and Functions **20 periods**
(10 marks)

Definition of Relation, Domain and Range of a Relation, Functions – its meaning and definition, Notation of Function, Image and Pre-Image of a function, Domain and Range of a function, Characteristics of a function, Equality of function, into and onto functions, one-one into and one-one onto functions, many-one into function.

Unit IV: Determinants **22 periods**
(10 marks)

Determinants of Second order, Determinants of Third order, Expansion of Determinants, Sarrus Diagram, Minor, Some properties of Determinants, Solution of Linear Equations, Cramer's Rule. Applied problems in Business.

Unit V: Matrices **22 periods**
(15 marks)

Meaning – Types of Matrices, Algebra of Matrices, Equality of Matrices, Addition and Subtraction of Matrices, Multiplication of Matrix by Scalar, Multiplication of Matrices, Transpose of a Matrix, Symmetric Matrix, Determinant of a Square Matrix, Minor, Co-factor, Adjoint of a Square Matrix, Inverse of a Matrix, Applications of Matrix, Solution of Linear Equations, Applications to Business problems.

PART B: COMMERCIAL ARITHMETIC

Unit VI: Partnership **16 periods**
(10 marks)

Investment of Capital for unequal period, Sharing Profit, Partner's Salaries, Interest on Capital, Profit Sharing on the admission of a new partner/retirement of an existing partner.

Unit VII: Bill of Exchange and Average Due Date **22 periods**
(10 marks)

Meaning of Bill of Exchange, Promissory Note, True Discount, Banker's Discount, Present Values, Bill Value, Banker's Gain, Discounted value,

Meaning of Average Due Date, Calculation of Average Due Date; When the amount is lent in one installment, and the repayment is sought in several installments.

Unit VIII: Stock and Shares 18 periods (10 marks)

Meaning and Nature of Shares, Meaning and Nature of Stock, Dividend and Yield, Ex-dividend and cum-dividend price, Brokerage.

Unit IX: Linear Programming 20 periods (10 marks)

Introduction – Linear inequations in two variables and their graphs, Solution set of a system of linear inequations, Meaning of Linear Programming and its importance, Objective, function, Optimization, Limitations of Linear Programming, Application areas of Linear Programming, Different types of Linear Programming (L.P.) Problems, Mathematical formulation of Linear Programming Problems, Graphical method of solution for problems in two variables, feasible and infeasible regions, feasible and infeasible solutions, Optimum feasible solution.

Unit X: Mixture or Alligations 14 periods (10 marks)

Meaning of Mixture or Alligation, Mixture of Three or more ingredients.

Recommended Books:

i) Fundamentals of Business Mathematics for Class 12
by Ranjit Paul, Amiya Prakashani.
Rangapara, Sonitpur
Assam – 784505.

ENTREPRENEURSHIP

Objectives:

1 Acquiring entrepreneurial spirit and be enterprising in all walks of life**.**
2 Familiarization with various uses of human resource for earning decent means of living.
1 Understanding the concept and process of Entrepreneurship - its contribution and role in the growth and development of individual and the nation.
2 Acquiring entrepreneurial quality, competency and motivation.
3 Learning the process and skills of creation and management of Entrepreneurial venture.

CLASS - 11

ENTREPRENEURSHIP (Theory)

Unit-wise weightage

Time: 3 Hrs
Marks: 70

Units	Periods	Marks
Part A: Theory		
I. Entrepreneurship and Human Activities	54	30
II. Acquiring Entrepreneurial Values and Motivation	54	30
III. Introduction to Market Dynamics	18	10
Part B: Practical	54	30
Total	**180**	**100**

Unit I: Entrepreneurship and Human Activities 54 periods (30 Marks)

Concept, Functions and need, Entrepreneurship Characteristics and Competency. Relevance of Entrepreneurship to Socio-Economic Gain-generating National Wealth, Creating Wage and Self -Employment, Micro, Small and Medium Enterprises, Optimizing Human and Natural Resource and Solving Problems in the path of prosperity, building enterprising Personality and Society. Process of Entrepreneurship Development. Nature, Purpose and pattern of Human Activities - Economic and Non-Economic. Need for innovation. Rationale and Relationship of Entrepreneurial pursuits and Human Activities.

Unit II: Acquiring Entrepreneurial Values and Motivation 54 periods (30 Marks)

Entrepreneurial Values, Attitude and Motivation-Meaning and concept. Developing Entrepreneurial Motivation and Competency - concept and process of Achievement Motivation, Self-efficacy, Creativity, Risk - taking, Leadership, Communication and Influencing Ability and Planning Action. Barriers to Entrepreneurship. Help and support to Entrepreneurs.

Unit III: Introduction to Market Dynamics 18 periods (10 Marks)

Understanding a Market. Competitive Analysis of the Market. Patents, Trademarks and Copyright.

CLASS – 11
ENTREPRENEURSHIP (Practical) Marks : 30

PRACTICAL 54 periods (30 Marks)

I. Study visit by students to any enterprise of own choice. With the help of a schedule/questionnaire the students will record observation regarding - the background of entrepreneur, reasons for selecting the entrepreneurial career, starting the enterprise, the type of enterprise, the process of setting this enterprise (products/services), production process, investment made and marketing practices followed, profit or loss, growth and development, problems faced, institutions/organisations which offer support and entrepreneur's level and type of satisfaction.

II. Preparation of a brief report based on the observations made during study-visit to an enterprise.

NOTE : No question paper for practical work will be set by the Board.

Recommended book:

1. *Textbook on Entrepreneurship for Class 11, by S.S. Khanka, a. Chand and Company Ltd., Ram Nagar, New Delhi – 110055.*

CLASS 12
ENTREPRENEURSHIP

Unit wise weightage

Time: 3 Hrs.
Marks: 100

Units		**Periods**	**Marks**
Part A: Theory			
I. Entrepreneurship Opportunities and Enterprise Creation		36	20
II. Enterprise Planning and Resourcing		36	20
III. Enterprise Management		54	30
Part B : Practical		54	30
1. Project Report/Market Survey Report	10 marks		
2. Viva-Voce on PR/MSR	5 marks		
3. Case study	10 marks		
4. Problem Solving	5 marks		
Total		**180**	**100**

Unit I: Entrepreneurial Opportunities and Enterprise Creation

36 periods

(20 Marks)

Sensing Entrepreneurial Opportunities, Environment Scanning, Market Assessment, Identification of Entrepreneurial Opportunities, Selection of an Enterprise, Steps in setting up of an Enterprise.

Unit II: Enterprise Planning and Resourcing **36 periods**
(20 Marks)

Capital Requirement, Funds Flow, Profit Ratios, Break Even Analysis etc. Mobilising Resources - Sources and Means of Funds, Facilities and Technologies for starting an Enterprise.

Unit III:Enterprise Management **54 periods**
(30 Marks)

General management: Basic Management functions.
Organizing/Production of goods and services - quality, quantity and flow of inputs.
Managing Market - Meaning, Function of Marketing, Marketing Mix, Product, Price, Place, Promotion (advertising and sales promotion).
Managing Finance - Sources of Long Term and Short Term Finances. Determination of Cost, Income, Calculation of Profit/Loss.
Managing Growth and Sustenance -Affecting Change, Modernisation, Expansion, Diversification and Substitution.
Entrepreneurial Discipline - Laws of Land, Ecology, Consumer's Concept, Adherence to Contract and Credits.

PRACTICAL **54 periods**
(30 marks)

Introduction:

The main objective of the course in Entrepreneurship is to generate in the students initiative, self-reliance and enthusiasm so as to empower them to become entrepreneurs both in spirit and performance. A number of skills such as observation, evaluation, communication, resource mobilization and management, risk assessment, team building etc. are also to be developed in the students. Leadership qualities, sensitivity to business ethics and adherence to a positive value system are the core issues that the course highlights while presenting different concepts related to entrepreneurship. Such a course should necessarily have a strong experimental component in the form of practical work. The objectives of the practical work are:

1. to introduce the students to the world of business by developing in them the core skills and competencies required for an entrepreneur.
2. to develop in the students qualities such as leadership, self-confidence, initiative, facing uncertainities, commitment, creativity, people and team building, integrity and reliability.
3. to enable the students to acquire the skills and knowledge needed for conducting surveys, collecting, recording and interpreting data and preparing simple estimates of demand for products.
4. to guide the students to prepare a Project Report.
5. to equip the students with knowledge and skills needed to plan and manage an enterprise through case studies conducted and recorded by the students in different fields such as resource assessment, market dynamics, finance management, cost determination, calculation of profit and loss etc.
6. to instill in the students important values and entrepreneurial discipline.

FORMAT **marks: 30**	**Total**
1. Project Report/MarketSurvey Report	10 Marks

2. Viva-Voce on PR /MSR 5 Marks
3. Case Study 10 Marks
4. Problem Solving 5 Marks

1. Project Report/Market Survey Report
(10 Marks)

a) Project Report

Preparation of a Project Report for an enterprise involving in manufacture of products.

Students may be provided adequate guidance to choose a project based on their interests and availability of information and authentic inputs in the locality. The Project Report shall include product description, production and general evaluation of prospects, Market aspects, production requirements, capital requirements ie., fixed assets & working capital, raw materials & allied supplies, man power (annual), other cost (annual), total annual cost, sales revenue and net profits. Further, the students will be required to appear for a Viva-voce on the basis of their projects, sufficient care should be taken by the students to prepare the report after studying the various aspects involved thoroughly. In a nutshell, the project report should lead to viable enterprise.

b) Market Survey Report

Market research is the process and technique of finding out who your potential customers are and what they want. The survey may be on products and services already available in the market or students may also conduct surveys for new products and services. The report of the survey should be organised under the following broad headings:

1. Objectives.
2. Methods and tools (interviews, questionnaires etc.) to be used to collect information.
3. Records of data and information.
4. Analysis of data and information.
5. Interpretation and conclusion.

For example, a survey may be conducted to find out the choice of households in toiletry soap, tooth paste etc. The data may be analysed to establish a pattern that may be useful to an entrepreneur.

Guidelines for assessment of Project Report / Market Survey Report

1. Presentation: Format, Clarity, Use of graphs, tables and other visuals, organisation, methodical recording of data and information and general neatness of execution.

(5 marks)

2. Originality and Creativity. **(3 marks)**

3. Authenticity of information and correctness of calculations and general feasibility

of the project/ sustainability of conclusion drawn in the survey. **(2 marks)**

2. Viva Voce on the Project Report /Market Survey Report (5 Marks)

The questions should establish that the report is the original work of the student and that the student has a reasonably clear understanding of the work carried out by him/her. Entrepreneurial qualities such as leadership, self-belief, creativity, originality, initiative etc. may also be assessed by asking a variety of questions related to the report.

3. Case Study (10 marks)

A case study is a focused research on an organization, enterprise, practice, behaviour or person undertaken to highlight an aspect that the study attempts to examine. For instance, a case study may be conducted on the pollution control methods being employed by an industry or a successful industrialist may be chosen as a subject of a case study to analyze and understand the strategies that the industrialist adopted to achieve success. Ideally, a case study should be conducted on subjects with the objectives of bringing to the fore beliefs, practices, strategies, values etc. that have made them what they are. Such studies help us to understand the way in which great minds think and operate. We may also conduct case studies on failures; why a company collapsed, how a service lost its market etc. From both the types of case study, we learn lessons; how to do something or how not to do something. They also provide valuable insight into the processes involved in an enterprise.

A few topics are suggested for carrying out case studies:

i) Drawing a profile of a successful entrepreneur.
ii) Studying a public sector undertaking and highlighting its success/failure, by analyzing the factors responsible.
iii) Studying a small scale unit in the locality to bring out the procedures and processes adopted by the unit to become a feasible business venture.
iv) A study of competition in business by choosing two or more rivals in the market and analyzing their strengths and weaknesses.
v) Take the school itself for a case study and analyze any two aspects of the school plant for chalking out a plan of action: infrastructure, academics, co-curricular activities etc.
vi) A case study on a thriving fast food shop/restaurant in your locality. What makes it so popular?
vii) A case study on the ways in which a business unit has mobilized its financial resources.
viii) A case study on the enterprise management techniques adopted by a business house.
ix) A case study on the marketing strategies of a successful consumer durable company.

x) A case study on any Specialized Institution that supports and guides the establishment of a small scale unit.

xi) Carrying out a case study on an established industrial house/company to find out the value system of the company and how it fulfills its social commitment/obligations.

xii) Study your school/college as an organization. Suggest strategies for development.

xiii) Study a business unit that has achieved remarkable growth. Analyse the different strategies adopted by the company to achieve growth.

xiv) Carrying out a case study on an established industry to ascertain the processes followed to reduce/prevent pollution.

xv) Study on environment friendly companies and their contribution to preservation.

Assessment of Case Studies

i) Presentation: Format, accuracy, clarity, authenticity and general neatness. **(7 marks)**

ii) Analysis and Conclusions. **(3 marks)**

4. Problem Solving (5 marks)

In this session, the students will be required to solve a problem in the form of a written test. The examiner may choose any problem related to the units in class 12 text book and set it for the class. The problem may be in the following areas:

a) How to scan the environment to establish the feasibility of a project.
b) Given certain figures showing the consumption pattern of a product, drawing conclusions that have a bearing on similar products.
c) Carrying out market assessment for a given product/service to ascertain the feasibility factor.
d) Assessment of Working Capital.
e) Calculation of total cost of production.
f) Calculation of break-even point.
g) Determining location of a manufacturing unit.
h) Problems in inventory control (calculation of the Economic Order Quantity and carrying out ABC analysis).

Assessment of Answers

The examiner may prepare five problems which are solved by him/her before they are presented to the students. The student may choose any one of the problems and solve it, showing the different steps/different reasons involved in the solution. If the problem does not involve actual calculations, it may not have anyone correct answer. So weightage should be given not only to the final answer but to the entire process of problem solving that the student has followed. Originality and innovative spirit should be rewarded. Where definite formulas are involved, accuracy should be given due weightage.

Recommended book:

1. *Entrepreneurship for Class 12,*
   by S.S.Khanka,

S.Chand & Company Ltd., New Delhi.

CHEMISTRY

Objectives:

The broad objectives of teaching chemistry at Higher Secondary stage are to help the learners:

1 To promote understanding of basic facts and concepts in chemistry while retaining the excitement of chemistry.

2 To develop an interest in students to study chemistry as discipline.

3 To strengthen the concepts developed at the secondary stage and to provide firm; foundation for further learning of chemistry at tertiary level more effectively.

4 To make students capable of studying chemistry in academic and professional courses (such as medicine, engineering, technology) at tertiary level.

5 To develop positive scientific attitude and to appreciate contribution of chemistry towards the improvement of quality of human life.

6 To expose the students to various emerging new areas of chemistry, and to different processes used in industries and their technological applications.

7 To equip students to face various changes related to health, nutrition, environment, population, weather, industries and agriculture.

8 To develop problem solving skills and nature curiosity, aesthetic sense and creativity.

9 To inculcate values of honesty, integrity, concern for life and preservation of the environment.

10 To make the learner realize the interface of chemistry with other discipline of science such as Physics, Biology, Geology, Geography etc.

11 To acquaint students with different aspects of chemistry used in daily life.

CLASS - 11
CHEMISTRY (Theory)

Unit-wise weightage
Theory Paper **Time: 3 Hrs.**
Marks: 70

Unit	Periods	Marks
I. Some Basic Concepts of Chemistry	13	3
1. Structure of Atom	17	6
2. Classification of Elements and Periodicity in Properties	8	4
3. Chemical Bonding and Molecular Structure	17	6
4. States of Matter: Gases and Liquids	12	4
5. Thermodynamics	16	6
6. Equilibrium	16	6
7. Redox Reactions	6	3
8. Hydrogen	9	3
9. s-Block Elements	14	5
10. Some p-Block Elements	15	6
11. Organic Chemistry: Some Basic Principles & Techniques	15	7
12. Hydrocarbons	16	8
13. Environmental Chemistry	6	3
Total	**180**	**70**

Unit I. Some Basic Concepts of Chemistry **13**

Discovery of electron, proton and neutron; atomic, isotopes and isobars. Thomson's model and its limitations, Rutherford's model and its limitations. Bohr's model and its limitations, concept of shells and subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p, and d orbitals, rules for filling electrons in orbitals-Aufbau's principle, Pauli's exclusion principle and Hund's rule, electronic configuration of atoms, stability of half filled and completely filled orbitals.

Unit III: Classification of Elements and Periodicity in Properties 8 periods (4 marks)

Significance of classification, brief history of the development of periodic table, modern periodic law and the present form of periodic table, periodic trends in properties of elements-atomic radii, ionic radii. Ionization enthalpy, electron gain enthalpy, electro negativity, valence.

Unit IV: Chemical Bonding and Molecular Structure 17 periods (6 marks)

Valence electrons, ionic bond, covalent bond: bond parameters. Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules, molecular orbital; theory of homo nuclear diatomic molecules (qualitative idea only), hydrogen bond.

Unit V: States of Matter: Gases and Liquids 12 periods (4 marks)

Three states of matter. Intermolecular interactions, type of bonding, melting and boiling points. Role of gas laws in elucidating the concept of the molecule, Boyle's law, Charles law, Gay Lussac's law, Avogadro's law. Ideal behaviour, empirical derivation of gas equation, Avogadro's number. Ideal gas equation. Derivation from ideal behaviour, liquefaction of gases, critical temperature.

Liquid state-Vapour pressure, viscosity and surface tension (qualitative idea only, no mathematical derivations).

Unit VI: Thermodynamics 16 periods (6 marks)

Concepts of system, types of systems, surroundings. Work, heat, energy, extensive and intensive properties, state functions.

First law of thermodynamics-internal energy and enthalpy. Heat capacity and specific heat, measurement of ΔU and ΔH, Hess's law of constant heat summation, enthalpy of: bond dissociation, combustion, formation, sublimation. Phase transformation.

Introduction of entropy as a state function, free energy change for spontaneous and non-spontaneous processes, criteria for equilibrium.

Unit VII: Equilibrium 16 periods (6 marks)

Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium-Le Chatelier's principle; ionic equilibrium-ionization of acids

and bases, strong and weak electrolytes, degree of ionization, concept of pH. Hydrolysis of salts (elementary idea). Buffer solutions, solubility product, common ion effect (with illustrative examples).

Unit VIII: Redox Reactions 6 periods (3 marks)

Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, applications of redox reactions.

Unit IX: Hydrogen 9 periods (3 marks)

Position of hydrogen in periodic table, occurrence, isotopes, preparation, properties and uses of hydrogen; hydrides-ionic, covalent and interstitial; physical and chemical properties of water, hard and soft water, heavy water; hydrogen peroxide-preparation, properties and structure; hydrogen as a fuel.

Unit X: s-Block Elements (Alkali and Alkaline earth metals) 14 periods (5 marks)

Group 1 and Group 2 elements:

General introduction, electronic configuration, occurrence, anomalous properties of the first element of each group, diagonal relationship, trends in the variation of properties (such as ionization enthalpy, atomic and ionic radii), trends in chemical reactivity with oxygen, water, hydrogen and halogens; uses.

Preparation and properties of some important compounds:
Sodium carbonate, sodium chloride, sodium hydroxide and sodium hydrogen carbonate, biological importance of sodium and potassium.

CaO, $CaCO_3$ and industrial use of lime and limestone, biological importance of Mg and Ca.

Unit XI: Some p-Block Elements. 15 periods (6 marks)

General Introduction to p-Block Elements.

Group 13 elements: General introduction, electronic configuration, occurrence. Variation of properties, oxidation states, trends in chemical reactivity, anomalous properties of first element of the group; Boron-physical and chemical properties, some important compounds: borax, boric acids, boron hydrides. Aluminium: uses, reactions with acids and alkalies.

Group 14 elements: General introduction, electronic configuration, occurrence, variation of properties, oxidation states, trends in chemical reactivity, anomalous behaviour of first element, Carbon-catenation, allotropic forms, physical and chemical properties; uses of some important compounds: oxides.
Important compounds of silicon and a few uses: silicon tetrachloride, silicones, silicates and zeolites.

Unit XII: Organic chemistry-Some Basic Principles and Techniques.

15 periods (7 marks)

General introduction, methods of qualitative analysis-paper chromatography, fractional distillations, Lassaigne's test and quantitative analysis-Victor's Meyer's method, classification and IUPAC nomenclature of organic compounds.

Electronic displacements in a covalent bond: inductive effect, electromeric effect, resonance and hyper conjugation.

Homolytic and heterolytic fission of a covalent bond: free radicals, carbocations, carbanions; electrophiles and nucleophiles, types of organic reactions.

Unit XIII: Hydrocarbons **16 periods (3 marks)**

Classification of hydrocarbons

Alkanes-Nomenclature, isomerism, conformations (ethane only), Physical properties, chemical reactions including halogenation, free radical mechanism, combustion and pyrolysis.

Alkenes-Nomenclature, structure of double bond (ethane) geometrical isomerism, physical properties, methods of preparation; chemical reactions: addition of hydrogen, halogen, water, hydrogen halides (Markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition.

Alkynes-Nomenclature, structure of triple bond (ethyne), physical properties. Methods of preparation, chemical reactions: acidic character of alkynes, addition reaction of–hydrogen, halogens, hydrogen halides and water.

Aromatic hydrocarbons: Introduction, IUPAC nomenclature; Benzene: resonance aromaticity; chemical properties: mechanism of electrophilic substitution – nitration, sulphonation, halogenation, Friedel Craft's alkylation and acylation: directive influence of functional group in mono-substituted benzene; carcinogenicity and toxicity.

Unit XIV: Environmental Chemistry **6 periods (3 marks)**

Environmental pollution-air, water and soil pollution, chemical reactions in atmosphere, smog, major atmospheric pollutants; acid rain, ozone and its reactions, effects of depletion of ozone layer, greenhouse effect and global warming-pollution due to industrial wastes; green chemistry as an alternative tool for reducing pollution, strategy for control of environmental pollution.

CLASS – 11

CHEMISTRY (Practical)

Practical Paper

Marks: 30

Evaluation Scheme for Examination	Periods	Marks
I. Volumetric Analysis	16	6+2=8
II. Salt Analysis	16	8
III. Content Based Experiment	10	4
IV. Class Record and Viva		3+2=5
V. Investigatory project & Viva		3+2=5
Total	**42**	**30**

A. Basic Laboratory Techniques (2 periods)

1. Cutting glass tube and glass rod
2. Bending a glass tube
3. Drawing out a glass jet
4. Boring a cork

I. VOLUMETRIC ANALYSIS 16 periods (8 marks)

Quantitative estimation

- Using a chemical balance
- Preparation of standard solution of oxalic acid.
- Determination of strength of a given solution of sodium hydroxide titrating it against standard solution of oxalic acid.
- Preparation of standard solution of sodium carbonate.
- Determination of strength of a given solution of hydrochloric acid by titrating it against standard sodium carbonate solution.

II. SALT ANALYSIS 16 periods (8 marks)

Qualitative analysis

Determination of one anion and one cation in a given salt.

Cations - Pb^{2+}, Cu^{2+}, As^{3+}, $A1^{3+}$, Fe^{3+}, Mn^{2+}, Ni^{2+}, Zn^{2+}, Co^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mg^{2+}, NH_4^+

Anions - CO_3^{2-}, S^{2-}, SO_3^{2-}, SO_4^{2-}, NO_2^-, NO_3^-, Cl^-, Br^-, I^-, PO_4^{3-}, $C_2O_4^{2-}$, CH_3COO^-

(Note: Insoluble salts excluded)

III. Content Based Experiments:

i) Characterisation and purification of chemical substances.

1. Determination of melting point of an organic compound.
2. Determination of boiling point of an organic compound.
3. Crystallization of impure sample of anyone of the following: Alum, copper sulphates, Benzoic acid.

ii) Experiment related to pH change

(a) Anyone of the following experiments:

1 Determination of pH of some solutions obtained from fruit juices, varied

concentrations of acids, bases and salts using pH paper or universal indicator.

2 Comparing the pH of solutions of strong and weak acid of same concentration.

3 Study the pH change in the titration of a strong base using universal indicator.

(b) Study of pH change by common-ion effect in case of weak acids and weak bases.

iii) Chemical equilibrium

One of the following experiments:

(a) Study the shift in equilibrium between ferric ions and thiocyanate ions by increasing/decreasing the concentration of either ions.

(b) Study the shift in equilibrium between $[Co(H_2O)_6]^{2+}$ and chloride ions by changing the concentration of either of the ions.

iv) Detection of Nitrogen, Sulphur, Chlorine, Bromine and Iodine in an organic compound.

PROJECT

Scientific investigations involving laboratory testing and collecting information from other sources.

A few suggested Projects

1 Checking the bacterial contamination in drinking water by testing sulphide ion.
2 Study of the methods of purification of water.
3 Testing the hardness, presence of iron, fluoride, chloride etc., depending upon the regional variation in drinking water and the study of causes of presences of these ions above permissible limit (if any).
4 Investigation of the foaming capacity of different washing soaps and the effect of addition of sodium carbonate on them.
5 Study of the acidity of different samples of the tea leaves.
6 Determination of the rate of evaporation of different liquids.
7 Study of the effect of acids and bases on the tensile strength of fibres.
8 Analysis of fruit and vegetables juices for their acidity.

Note: ***Any other investigatory project, which involves about 10 periods of work, can be chosen with the approval of the teacher.***

NOTE : No question paper for practical work will be set by the Board.

Recommended book:

Chemistry for class 11 (Theory & Practical)
By Dr. S.P. Jauhar
Modern Publishers.
Chancellor Commercial Hem Baruah Road,
Guwahati - 781001

CLASS - 12
CHEMISTRY (Theory)

Unit-wise weightage
Theory Paper **Time: 3 Hrs.**
Marks: 70

Unit		Periods	Marks
I.	Solid state	12	4
II.	Solutions	13	5
III.	Electrochemistry	14	6
IV.	Chemical Kinetics	12	4
V.	Surface chemistry	8	4
VI.	General Principles and Processes of Isolation of Elements	7	3
VII.	p-Block elements	15	8
VIII.	d-and f-Block Elements	14	5
IX.	Coordination Compounds	12	3
X.	Haloalkanes and Haloarenes	10	4
XI.	Alcohols, Phenols and Ethers	12	4
XII.	Aldehydes, Ketones and Carboxylic acids	13	6
XIII.	Organic Compounds containing nitrogen	10	4
XIV.	Biomolecules	12	4
XV.	Polymers	8	3
XVI.	Chemistry in Everyday life	8	3
	Total	**180**	**70**

Unit I: Solid State **12 periods (4 marks)**

Classification of solids based on different binding forces: molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea), unit cell in two dimensional and three dimensional lattices, calculation of density of unit cell, packing in solids, voids, number of atoms per unit cell in a cubic unit cell, point defects, electrical and magnetic properties.

Unit II: Solutions **13 periods (5 marks)**

Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties-relative lowering of vapour pressure, elevation of Boiling Point, depression

Rate of a reaction (average and instantaneous), factors affecting rates of reaction; concentration, temperature, catalyst; order and molecularity of a reaction; rate law and specific rate constant, integrated rate equations and half life (only for zero and first order reactions); concept of collision theory (elementary idea, no mathematical treatment)

Unit V: Surface Chemistry 8 periods (4 marks)

Adsorption-physisorption and chemisorption; factors affecting adsorption of gases on solid; catalysis: homogeneous and heterogeneous, activity and selectivity: enzyme catalysis; colloidal state: distinction between true solutions, colloids and suspensions; lyophilic, lyophobic, multimolecular and macromolecular colloids; properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation; emulsion-types of emulsions.

Unit VI: General Principles and Processes of Isolation elements 7 periods (3 marks)

Principles amd methods of extraction-concentration, oxidation, reduction electrolytic method and refining; occurrence and principles of extraction of aluminium, copper, zinc and iron.

Unit VII: p-Block elements 15 periods (8 marks)

Group 15 elements: General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties; nitrogen-preparation; properties and uses; compounds of nitrogen: preparation and properties of ammonia and nitric acid, oxides of nitrogen (structure only); Phosphorous-allotropic forms; compounds of phosphorous:

preparation and properties of phosphine, halides (PCl^3, PCl^5) and oxoacids (elementary idea only)

Group 16 elements: General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties, dioxygen: preparation, properties and uses; simple oxides; Ozone. Sulphur-allotropic forms; compounds of Sulphur: preparation, properties and uses of Sulphur dioxide; sulphuric acid: industrial process of manufacture, properties and uses, oxoacids of Sulphur (structures only)

Group 17 elements: General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; compounds of halogens: preparation, properties and uses of chlorine and hydrochloric acid, interhalogen compounds, oxoacids of halogens (structure only)

Group 18 elements: General introduction, electronic configuration. Occurrence, trends in physical and chemical properties, uses.

Unit VIII: d and f Block elements 14 periods (5 marks)

General introduction, electronic configuration, occurrence and characters of transition metals, general trends in properties of the first row transition metals-metallic character, ionization enthalpy, oxidation states, ionic radii,

colour catalytic property, magnetic properties, interstitial compounds, alloy formation. Preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$.

Lanthanoids-electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction.

Actinoids-Electronic configuration, oxidation states.

Unit IX: Coordination compounds 12 periods (3 marks)

Coordination compounds-Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding; isomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological systems).

Unit X: Haloalkanes and Haloarenes. 10 periods (4 marks)

Haloalkanes:
Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions.

Haloarenes:
Nature of C-X bond, substitution reactions (directive influence of halogen for monosubstituted compounds only)

Uses and environmental effects of-dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT.

Unit XI: Alcohols, Phenols and Ethers 12 periods (4 marks)

Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only); identification of primary, secondary and tertiary alcohols; mechanism of dehydration, uses of methanol and ethanol.

Phenols: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophillic substitution reaction, uses of phenols.

Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses.

Unit XII: Aldehydes, Ketones and Carboxylic Acids 13 periods (6 marks)

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes; cannizaro's reactions, uses.

Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

Unit XIII: Organic compounds containing Nitrogen **10 periods**
(4 marks)

Amines: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines.

Cyanides and Isocyanides: Nomenclature, important methods of preparation, physical and chemical properties of cyanide and isocyanide.

Diazonium salts: Preparation, chemical reactions and importance in synthetic organic chemistry.

Unit XIV: Biomolecules **12 periods**
(4 marks)

Carbohydrates-Classification (aldoses and ketoses), monosaccharides (glucose and fructose), oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); importance.

Proteins-Elementary idea of α - amino acids, peptide bond, polypeptides proteins, primary structure, secondary structure, tertiary structure and quaternary structure (qualitative idea only), denaturation of proteins; enzymes.

Vitamins-classification and functions.

Nucleic Acids: DNA & RNA. Primary structure of DNA and its double helix replication, genetic code.

Unit XV: Polymers **8 periods**
(3 marks)

Classification-natural and synthetic, methods of polymerization (addition and condensation), copolymerization. Some important polymers: nature and synthetic like polythene, nylon, polyesters, bakelite, rubber.

Unit XVI: Chemistry in Everyday life: **8 periods**
(3 marks)

1. **Chemicals in medicines-** analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines.
2. **Chemicals in food-** preservatives, artificial sweetening agents.
3. **Cleansing agents-** soaps and detergents, cleansing action.

CLASS - 12
CHEMISTRY (Practicals)

Practical Paper **Time: Hrs**
Marks: 30

Evaluation Scheme for Examination	Periods	Marks
I. Volumetric analysis	8	6+2=8
II. Salt analysis	14	8
III. Content Based Experiment	36	4
IV. Class record and viva		3+2=5
V. Investigatory Project & Viva		3+2=5
Total	**58**	**30**

I. Volumetric analysis

Determination of concentration/molarity of $KMnO_4$ solution by titrating it against a standard solution of:

(i) Oxalic acid, (ii) Ferrous ammonium sulphates

(Students will be required to prepare standard solutions by weighing themselves).

II. Salt Analysis

Qualitative analysis

1 Determination of one cation and one anion in a given salt.

Cations – Pb^{2+}, Cu^{2+}, As^{3+}, Al^{3+}, Fe^{3+}, Mn^{2+}, Zn^{2+}, Co^{2+}, Ni^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mg^{2+}, NH_4^+

Anions – CO_3^{2-}, S^{2-}, SO_3^{2-}, SO_4^{2-}, NO_2^-, NO_3^-, $C1^-$, Br^-, I^-, PO_4^{3-}, $C_2O_4^{2-}$, CH_3COO

(Note: Insoluble salts excluded)

III. Content Based Experiment

i. Surface Chemistry

d. Preparation of one lyophilic and one lyophobic sol.
Lyophilic Sol-starch, egg albumin and gum
Lyophobic Sol-aluminium hydroxide, ferric hydroxide, arsenous sulphide.

(b) Study of the role of emulsifying agents in stabilizing the emulsions of different oils.

ii. Chemical Kinetics

(a) Effect of concentration and temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid.

(b) Study of reaction rates of any one of the following:

(i) Reaction of iodide ion with hydrogen peroxide at room temperature using different concentration of iodide ions.

(ii) Reaction between potassium iodate, KIO_3 and sodium sulphite: (Na_2SO_3) using starch solution as indicator (clock reaction).

iii. Thermochemistry

Any one of the following experiments

(i) Enthalpy of dissolution of copper sulphates or potassium nitrate.

(ii) Enthalpy of neutralization of strong acid (HCl) and strong base (NaOH)

(iii) Determination of enthalpy change during interaction (Hydrogen bond formation) between acetone and chloroform

iv. Electrochemistry

Variation cell potential in $Zn/Zn^{2+}\|Cu^{2+}/Cu$ with change in concentration of electrolytes ($CuSO_4$ or $ZnSO_4$) at room temperature.

v. Chromatography

(ii) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of R_f values.

(iii) Separation of constituents present in an inorganic mixture containing two cations only (constituents having large difference in R_f values to be provided).

vi. Preparation of Inorganic Compounds

(i) Preparation of double salt of ferrous ammonium sulphates or potash alum.

(ii) Preparation of potassium ferric oxalate.

vii. Preparation of Organic compounds

Preparation of any two of the following compounds

(i) Acetanilide
(ii) Di-benzal acetone
(iii) P-Nitroacetanilide
(iv) Aniline yellow or 2-Napthol aniline dye
(v) Iodoform

viii. Tests for the functional groups present in organic compounds:

Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (primary) groups.

ix. Characteristic tests of carbohydrates, fats and proteins in pure samples and their detection in given food stuffs.

PROJECT

Scientific investigations involving laboratory testing and collecting information from other sources.

A few suggested Projects.

2 Study of presence of oxalate ions in guava fruit at different stages of ripening.
3 Study of quantity of casein present in different samples of milk.
4 Preparation of soybean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, etc.
5 Study of the effect of potassium bisulphate as food preservative under various conditions (temperature, concentration, time etc.).
6 Study of digestion of starch by salivary amylase and, effect of pH and temperature on it.
7 Comparative study of the rate of fermentation of following materials: wheat flour, gram flour, Potato juice, carrot juice etc.
8 Extraction of essential oils present in Saunf (aniseed), Ajwain (carum), Illaichi (cardamom).
9 Study of common food adulterants in fat, oil, butter, sugar, turmeric powder, chilli powder and pepper.

Note: ***Any investigatory project, which involves about 10 periods of work can be chosen with the approval of the teacher.***

NOTE: No question paper for practical work will be set by the Board.

Recommended books:

Modern abc of Chemistry – Modern Publishers classes 11 & 12
Modern abc Practical chemistry - Modern Publishers classes 11 & 12

BIOLOGY

OBJECTIVES:

1 To promote understanding of basic principles of Biology.
2 To expose the learners to emerging knowledge and its relevance to individuals and society.
2 To acquaint the students with benefits of knowing about issues related to nutrition, health, population, environment and development.
3 To encourage rationale/specific attitude to issues related to population, environment and development.
4 To develop skills essential to study and understand complexities of living world and harmonious co-existence.
5 To enhance awareness about environmental issues, problems and the appropriate solutions.
6 To develop appropriate environmental ethics and values.
7 To enable the students to appreciate the complexity of living world and the role of Biology vis-à-vis other disciplines.
8 To enable the students to appreciate role of Biology in dispelling myths, misconceptions and misbeliefs.

CLASS - 11
BIOLOGY (Theory)

Unit-wise weightage

Theory Paper **Time: 3 Hrs.**
Marks: 70

Unit		Periods	Marks
I.	Diversity in living world	25	07
II.	Structural organization in animals and plants	30	10
III.	Cell: Structure and function	40	17
IV.	Plant physiology	45	18
V.	Human physiology	40	18
	Total	**180**	**70**

Unit-I: Diversity in living world

Part A: **11 periods**
(3 marks)

Systematics and binomial system of nomenclature; Salient features of plant (Major groups, Angiosperms, upto sub-class) classification.
Botanical gardens, herbaria.

Part B: **14 periods**
(4 marks)

Classification of living organisms (Five kingdom classification, major groups and principles of classification within each kingdom).

Unit-II : Structural Organisation in animals and plants

Part A : **15 periods**
(5 marks)

Tissues in plants (meristematic and permanent) morphology, anatomy and functions of different parts of flowering plants. Root, stem, leaf, inflorescence, flower, fruit and seed.

Part B: **15 periods**
(5 marks)

Tissues in animals (epithelial, connective, muscular and nervous) Morphology, anatomy and functions of different systems of an annelid (earthworm) and an insect (cockroach) and an amphibian (frog).

Unit III: Cell: Structure and function

Part A: **22 periods**
(9 marks)

Cell: cell wall, cell membrane and cell organelles (plastids, mitochondria, endoplasmic reticulum, golgi bodies/ dictyosomes, ribosomes, lysosomes, vacuoles, centrioles) and nuclear organization.
Enzymes: types, properties and functions.

Part B: **18 periods**
(8 marks)

Mitosis, meiosis, cell cycle.
Structure and functions of carbohydrates, proteins, lipids and nucleic acids.

Unit IV : Plant Physiology **45 periods**
(18 marks)

Plants and water relations – absorption and movement (diffusion, osmosis, plasmolysis, permeability, water potential, ambibition); theories of water translocation – root pressure, transpiration pull; transpiration – significance, factors affecting rate of transpiration; mechanism of stomatal opening and closing (potassium ion exchange theory).

Mineral nutrition – functions of minerals, essential major elements and trace elements; deficiency symptoms of elements; translocation of solutes, biological nitrogen fixation.

Photosynthesis – significance, site of photosynthesis (functional aspect of chlorophyll structure); photochemical and biosynthetic phases; electron transport system; photophosphorylation (cyclic and non-cyclic); C_3 and C_4 pathway; photorespiration; chemosynthesis.

Mechanism of respiration – glycolysis, Krebs cycle, electron transport system, anaerobic respiration; respiratory quotient; compensation point; fermentation.

Plant growth and development – growth regulators (phytohormones) – Auxins, gibberellins, cytokinins, ethylene, ABA; seed germination and seed dormancy; senescence; abscission.

Unit V: Human Physiology **40 periods**
(18 marks)

Nutrition and its types; nutrients – food and vitamins; Intracellular and extra cellular digestion; digestive system and process in humans (ingestion, digestion,absorption, assimilation, egestion); role of enzymes and hormones in digestion, malnutrition and undernutrition; disorders related to nutrition.

Respiration in humans – respiratory organs, mechanism; breathing and its regulation; transport of gases through blood; common respiratory disorders – prevention and cure. Circulation of body fluids – open system, closed system in humans, blood and its composition, structure and pumping action of human heart; pulmonary and systematic circulation; heart beat and pulse; rhythmicity of heart-beat, blood related disorders - hypertension, atheroma and arteriosclerosis; pacemaker; lymphatic system, immunity and immune system.

Nitrogenous waste elimination – ammonetelism, ureotelism, uricotelism; excretory system of humans; composition and formation of urine; role of kidney in osmoregulation, kidney failure; dialysis, kidney transplantation; role of ADH; role of liver in excretion.

Locomotion and movements; human skeleton – axial and appendicular including cranium and rib cage bones; Joints and their types; bone, cartilage and their disorders (arthritis, osteoporosis); mechanism of muscle contraction; red and white muscles in movements.

Nervous co-ordination in humans; human nervous system – structure and functions of brain and spinal cord, transmission of nerve impulse; reflex action; sensory receptors; structure and function of sense organs – eye, ear, nose and tongue.

Human endocrine system; hormones and their functions; hormonal imbalance and diseases; hypothalamo – hypophysical axis; feedback controls.

CLASS - 11
BIOLOGY (Practical)

Practical Paper
Marks: 30

Unit	**Marks**
I. Experiment and Spotting	20
II. Record of one investigatory project and viva based on the project	5
III. Class record and viva based on experiments	5
Total	**30**

A. List of Experiments:

Part-I (Perform any four experiments)

1. Study and describe three locally available common flowering plants from each of the following families (*Solanaceae, Fabaceae and Liliaceae*)
2. Preparation and study of T.S. of dicot and monocot roots and stems (normal).
3. Study of osmosis by potato osmometer.
4. Study of plasmolysis in epidermal peels (e.g. *Rhoeo* leaves).
5. Study of distribution of stomata in the upper and lower surface of leaves.
6. Separate plant pigments through paper chromatography.

Part-II (Perform any four Tests)

7. Test for the presence of sugar, starch, proteins and fats. To detect them in

suitable plant and animal materials.

8. To study effect of different temperatures on the activity of salivary amylase on starch.
9. To test the presence of urea in urine.
10. To detect the presence of sugar in urine/blood sample.
11. To detect the presence of albumin in urine.
12. To detect the presence of bile salts in urine.

B. Study/Observation of the following (spotting). (Perform any four)

1. Study of the specimens and identification with reasons – Bacteria, *Oscillatory*, *Spirogyra*, Rhizopus, mushrooms, Yeast, liverwort, moss, fern, pine, one monocotyledon and one dicotyledon and one lichen.
2. Study of specimens and identification with reasons – *Amoeba*, *Hydra*, *Liverfluke*, *Ascaris*, leech, earthworm, prawn, silkworm, honeybee, snail, starfish, shark, Rohu, frog, lizard, pigeon and rabbit.
3. Study of tissues, and diversity in shapes and sizes of plant and animal cells (e.g. palisade cells, guard cells, parenchyma, collenchyma, sclerenchyma, xylem, phloem, squamous epithelium, muscle fibres and mammalian blood smear) through temporary/permanent slides.
4. Study of mitosis in onion root tip cells and animal cells (grasshopper) from permanent slides.
5. Study of different modifications in root, stem and leaves.
6. Study and identify different types of inflorescence.
7. Study of imbibition in seeds/raisins.
8. Observation and comments on the experimental set up on:
    a) Anaerobic respiration
    b) Phototropism
    c) Apical bud removal
    d) Suction due to transpiration.
9. To study human skeleton and different types of joints.
10. Study of external morphology of earthworm, cockroach and frog through models.

C. Project Report

Students are also expected to carry out one investigatory project that would engage them for about a week in actual experiment. They would be expected to submit a project report of the same that would include a presentation of the results obtained in their investigation.

List of investigatory projects suggested
(Any one to be submitted at the time of examination)

1. Locomotion in fishes, importance of different fins in balancing and steering the body.
2. Preparation of a model of DNA.

3. Preparation of a three dimensional model of plant/animal cell.
4. Preparation of a model of Mitosis.
5. Preparation of a model of Meiosis.
6. To study the chlorophyll content in different species of plants.
7. Determination of essentiality of minerals for plant growth, recording of deficiency symptoms.
8. Effect of fertilizers on the rate of germination, elongation of hypocotyl and the length of root.

N.B.: ***These are only specimens of investigatory projects. In order to promote innovativeness, the students should be encouraged to take up new projects (other than the ones mentioned above) in consultation and approval of the teacher concerned.***

NOTE : No question paper for practical work will be set by the Board.

Recommended books:

1. *Biology for class 11 (Theory)*
   by P.S.Verma & B.P.Pandey
   S. Chand & company Ltd.
   Ram Nagar, New Delhi – 110055.

2. *Biology (Practicals)*
   by Y.P.Purang
   Frank Bros & Co
   4675 – A,21 Ansari Road, Darya Ganj,
   New Delhi – 110002

CLASS - 12
BIOLOGY (Theory)

Unit-wise weightage
Theory Paper **Time: 3 Hrs.**
Marks: 70

Unit		Periods	Marks
I.	Sexual Reproduction	35	12
II.	Genetics & Evolution	45	20
III.	Biology and Human Welfare	35	12
IV.	Biotechnology and Its applications	30	12
V.	Ecology and Environment	35	14
	Total	**180**	**70**

Unit I : SEXUAL REPRODUCTION

Part A: **16 periods**

(5 marks)

Pollination (types and factors) and Fertilization in flowering plants.

Development of seeds and fruits.

Part B: **19 periods (7 marks)**

Human reproduction : Reproductive system in man and woman, menstrual cycle, production of gametes, fertilization, implantation, embryo development, pregnancy and parturition.

Reproductive health – birth control, contraception and sexually transmitted diseases.

Unit II : GENETICS AND EVOLUTION

Part A: **27 periods**

(12 marks)

Mendelian inheritance.

Chromosome theory of inheritance, deviation from Mendelian's ratio (gene interaction – Incomplete dominance, co-dominance, complementary genes), Multiple alleles.

Linkage and crossing over.

DNA – replication, transcription, translation.

Gene expression and regulation.

Part B: **18 periods**

(8 marks)

Sex determination in human beings : XX, XY

Inheritance pattern of haemophilia and blood groups in human beings.

Genome and Human Genome Project.

DNA finger printing

Evolution : Theories and evidences.

Unit III : BIOLOGY AND HUMAN WELFARE

Part A: **18 periods**

(6 marks)

Plant Breeding, Tissue culture, food production.

Microbes in household food processing, industrial production, sewage treatment and energy generation.

Bio-war, Biopiracy, biopatent.

Part B: **17 periods**

(6 marks)

Animal husbandry: Meaning, Cattle farming, Bee keeping.

Basic concept of immunology

Pathogens, Parasites

Cancer and AIDS

Adolescence and Drug/Alcohol Abuse.

Unit IV : BIOTECHNOLOGY AND ITS APPLICATION

Part A: **15 periods**

(6 marks)

Genetically modified (GM) Organisms, biosafety issues.

Insulin and Bt cotton.

Part B: **15 periods**

(6 marks)

Recombinant DNA technology

Applications in health, Agriculture and Industry.

Unit V: ECOLOGY AND ENVIRONMENT

Part A: **17 periods (7 marks)**

Centres of diversity and conservation of biodiversity, National parks and sanctuaries.

Environmental issues: Pollution – types, pollutants,

Global warming, ozone layer, deforestation.

Part B: **18 periods**

(7 marks)

Ecosystem: Components, types and Energy flow.

Species, population and community.

Ecological adaptations: Adaptations in plants – Adaptation to light regime, Adaptation in xerophytic conditions, Adaptation in saline environment; Adaptations in animals – physiological adaptations, Behavioural adaptations.

CLASS - 12
BIOLOGY (Practical)

Practical Paper **Time : Hrs**

Marks: 30

Unit		**Marks**
I.	Two experiments	4+4=8
II.	Slide preparation	5
III.	Spotting	7
IV.	Investigatory project and viva based on the project	5
V.	Record and Viva based on the experiment	5
	Total	**30**

List of experiments:

1. Collect and study soil from two different sites and study them for texture.
2. Collect and study soil from two different sites and study them for moisture content.
3. Study the pH and water holding capacity of soil. Correlate with the kinds of plants found in them.
4. Collect water from different water bodies around you and study them for pH, clarity and presence of any living organisms.
5. Study of the presence of pollutants matter in water.
6. Study of plant population density by quadrat method.
7. Study of plant population frequency by quadrat method.
8. Study of mitosis in onion root tip (preparation).
9. Study of pollen germination on a slide.

Study/observation of the following (Spotting)

1. Study and identify stages of gamete development i.e. T.S. of testis and T.S. of ovary through permanent slide (from any mammal).
2. Study of meiosis in onion bud cell or grass hopper testis through permanent slide.
3. Study of T.S. of blastula through permanent slide.
4. Study of Mendelian inheritance using charts.
5. Study of prepared pedigree charts of genetic traits such as rolling of tongue, blood groups, widow's peak, colour blindness.
6. To identify common diseases causing organism like *Ascaris, Entamoeba, Plasmodium,* ringworm. Comment on symptoms of diseases that they cause through permanent slides or specimens.
7. Study of plants and animals found in Xerophytic condition. Comment upon their adaptation/ecosystem.
8. Study of plants and animals found in aquatic conditions. Comment upon their adaptation/ecosystem.
9. Study of analogous and homologous organs in various plants and animals.

Project Report

Students are also expected to carry out one investigatory project that would engage them for about a week in actual experimentation. They would be expected to submit a project report of the same that would include a presentation of the results obtained in their investigation.

List of Investigatory Project suggested
(Any one to be submitted at the time of examination)

1. Study of coaguable and non-coaguable milk protein.
2. Study of the effect of osmotic stress by administration of hypertonic saline solution in frog.
3. Study of aquatic ecosystem (pond, river, lake).
4. Study of Zooplanktons from fresh water, ponds and tanks.
5. Study of Phytoplanktons from fresh water, ponds and tanks.
6. Preparation of a three dimensional model of a plant or animal cell.
7. Adaptability in cockroach.
8. Study of the breaking of dormancy of seeds by Boron and Copper treatments.

9. Study of Mendelian traits in pea.
10. Effects of antibiotics on micro-organisms.
11. Population survey to identify human phenotypic characters such as rolling of tongue, fused ear lobes, colour blindness etc.
12. Study of RBCs and WBCs.

N.B: ***These are only specimens of investigatory projects. In order to promote innovativeness, the students should be encouraged to take up new projects (other than the ones mentioned above) in consultation and with the approval of the teacher concerned.***

NOTE: No question paper for practical work will be set by the Board.

Recommended books:

1. *Biology for class 12 (Theory)*
   by P.S.Verma & B.P.Pandey
   S. Chand & company Ltd.
   Ram Nagar, New Delhi – 110055.

2. *Biology (Practicals)*
   by Y.P.Purang
   Frank Bros & Co
   4675 – A,21 Ansari Road, Darya Ganj,
   New Delhi – 110002

PHYSICS

OBJECTIVES:

1 Emphasis on the basic conceptual understanding of the content.
2 Emphasis on use of SI units, symbols, nomenclature of physical quantities and formulations as per international standards.
2 Providing logical sequencing of units of the subject matter and proper placement of concepts with their linkage for better learning.
3 Reducing the curriculum load by eliminating overlapping of concepts/content within the discipline and other disciplines.
4 Promotion of process-skills, problem-solving abilities and applications of Physics concepts.
5 Strengthen the concepts developed at the secondary stage to provide firm foundation for further learning in the subject.
6 Expose the learners to different processes used in Physics-related industrial and technological applications.
7 Develop process-skills and experimental, observational, manipulative, decision making and investigatory skills in the learners.
8 Promote problem solving abilities and creative thinking in learners.
9 Develop conceptual competence in the learners and make them realize and appreciate the interface of Physics with other disciplines.

CLASS - 11
PHYSICS (Theory)

Unit-wise weightage
Theory Paper **Time: 3 Hrs.** **Marks: 70**

Unit		Periods	Marks
I.	Physical World & Measurement	10	04
II.	Kinematics	30	10
III.	Laws of Motion	16	08
IV.	Work, Energy & Power	16	06
V.	Motion of System of Particles & Rigid Body	18	06
VI.	Gravitation	14	06
VII.	Properties of Bulk Matter	28	10
VIII.	Thermodynamics	12	05
IX.	Behaviour of Perfect Gas & Kinetic Theory of Gases	8	05
X.	Oscillations & Waves	28	10
	Total	**180**	**70**

Unit-I: Physical World and Measurement **10 periods**
(4 marks)

Physics – scope and excitement; nature of physical laws; Physics, technology and society. Need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units. Length, mass and time measurements; accuracy and precision of measuring instruments; errors in measurement; significant figures.
Dimensions of physical quantities, dimensional analysis and its applications.

Unit II: Kinematics **30 periods**
(10 marks)

Frame of reference. Motion in a straight line: Position-time graph, speed and velocity.
Uniform and non-uniform motion, average speed and instantaneous velocity.
Uniformly accelerated motion, velocity-time, position-time graphs, relations for uniformly accelerated motion (graphical treatment).
Elementary concepts of differentiation and integration for describing motion.
Scalar and vector quantities: Position and displacement vectors, general vectors and notation, equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors. Relative velocity (basic concepts).
Unit vector; Resolution of a vector in a plane – rectangular components. Motion in a plane. Cases of uniform velocity and uniform acceleration-projectile motion. Uniform circular motion.

Unit III: Laws of Motion **16 periods**
(8 marks)

Intuitive concept of force. Inertia, Newton's first law of motion; momentum

Unit IV : Work, Energy and Power **16 periods**
(6 marks)

Scalar product of vectors. Work done by a constant force and a variable force; kinetic energy, work-energy theorem, power.

Notion of potential energy, potential energy of a spring, conservative forces: conservation of mechanical energy (kinetic and potential energies); non-conservative forces: elastic and inelastic collisions in one and two dimensions.

Unit V : Motion of System of Particles and Rigid Body **18 periods**
(6 marks)

Centre of mass of a two-particle system, momentum conservation and center of mass motion. Centre of mass of rigid body.

Vector product of vectors; moment of a force, torque, angular momentum, conservation of angular momentum with some examples

Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions; moment of inertia, radius of gyration.

Values of moments of inertia for simple geometrical objects (no derivation). Statement of parallel and perpendicular axes theorems and their applications.

Unit VI: Gravitation **14 periods**
(6 marks)

Kepler's laws of planetary motion. The universal law of gravitation.

Acceleration due to gravity and its variation with altitude and depth.

Gravitational potential energy; gravitational potential. Escape velocity. Orbital velocity of a satellite. Geo-stationary satellites.

Unit VII: Properties of Bulk Matter **28 periods**
(10 marks)

Elastic behaviour, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear, modulus of rigidity.

Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes).

Viscosity, Stokes' law, terminal velocity, Reynold's number, streamline and turbulent flow. Bernoulli's theorem and its applications.

Surface energy and surface tension, angle of contact, application of surface tension ideas to drops, bubbles and capillary rise.

Heat, temperature, thermal expansion; specific heat – calorimetry; change of state – latent heat.

Heat transfer-conduction, convection and radiation, thermal conductivity, Newton's law of cooling.

Unit VIII: Thermodynamics **12 periods**
(5 marks)

Thermal equilibrium and definition of temperature (zeroth law of thermodynamics). Heat, work and internal energy. First law of thermodynamics.

Second law of thermodynamics: reversible and irreversible processes. Heat engines and refrigerators.

Unit IX: Behaviour of Perfect Gas and Kinetic Theory 8 periods (5 marks)

Equation of state of a perfect gas.
Kinetic theory of gases – assumptions, concept of pressure. Kinetic energy and temperature; rms speed of gas molecules; degrees of freedom, law of equipartition of energy (statement only) and application to specific heats of gases; concept of mean free path, Avogadro's number.

Unit X : Oscillations and Waves 28 periods (10 marks)

Periodic motion – period, frequency, displacement as a function of time. Periodic functions. Simple harmonic motion (S.H.M) and its equation; phase; oscillations of spring – restoring force and force constant; energy in S.H.M. – kinetic and potential energies; simple pendulum – derivation of expression for its time period; free, forced and damped oscillations (qualitative ideas only), resonance.
Wave motion. Longitudinal and transverse waves, speed of wave motion. Displacement relation for a progressive wave. Principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats, Doppler effect.

CLASS - 11
PHYSICS (Practical)

Marks: 30

Note: Every student will perform 8 experiments (4 from each section) and 6 activities (3 from each section) during the academic year.
Two demonstration experiments must be performed by the teacher with participation of students. The students will maintain a record of these demonstration experiments.

Evaluation Scheme for Practical Examination:

10	One experiment from any one section		8 marks
11	Two activities (one from each section)	(4+4)	8 marks
12	Practical record (experiments & activities)		5 marks
13	Record of demonstration experiments & Viva based on these experiments		4 marks
14	Viva on experiments & activities		5 marks
	Total		**30 marks**

SECTION A

Experiments

1. Use of Vernier Callipers

(i) to measure diameter of a small spherical/cylindrical body.
(ii) to measure dimensions of a given regular body of known mass and hence find its density.
(iii) to measure internal diameter and depth of a given beaker/calorimeter and hence find its volume.

2. Use of screw gauge
   (i) to measure diameter of a given wire, (ii) to measure thickness of a given sheet (iii) to measure volume of an irregular lamina.
3. To determine radius of curvature of a given spherical surface by a spherometer.
4. To find the weight of a given body using parallelogram law of vectors.
5. Using a simple pendulum, plot L-T and L-T^2 graphs. Hence find the effective length of second's pendulum using appropriate graph.
6. To study the relationship between force of limiting friction and normal reaction and to find co-efficient of friction between a block and a horizontal surface.
7. To find the downward force, along an inclined plane, acting on a roller due to gravitational pull of the earth and study its relationship with the angle of inclination by plotting graph between force and $\sin\theta$.

Activities

1. To make a paper scale of given least count, e.g. 0.2cm, 0.5cm.
2. To determine mass of a given body using a metre scale by principle of moments.
3. To plot a graph for a given set of data, with proper choice of scales and error bars.
4. To measure the force of limiting friction for rolling of a roller on a horizontal plane.
5. To study the variation in range of a jet of water with angle of projection.
6. To study the conservation of energy of a ball rolling down on inclined plane (using a double inclined plane).
7. To study dissipation of energy of a simple pendulum by plotting a graph between square of amplitude and time.

SECTION B

Experiments

1. To determine Young's modulus of elasticity of the material of a given wire.
2. To find the force constant of a helical spring by plotting graph between load and extension.
3. To study the variation in volume with pressure for a sample of air at constant temperature by plotting graphs between P and V, and between P and I/V.
4. To determine the surface tension of water by capillary rise method.
5. To determine the coefficient of viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body.
6. To study the relationship between the temperature of a hot body and time by plotting a cooling curve.
7. (i) To study the relation between frequency and length of a given wire under constant tension using sonometer.
   (ii) To study the relation between the length of a given wire and tension

for constant frequency using sonometer.

8. To find the speed of sound in air at room temperature using a resonance tube by two-resonance positions.
9. To determine specific heat of a given (i) solid (ii) liquid, by method of mixtures.

Activities

1. To observe change of state and plot a cooling curve for molten wax.
2. To observe and explain the effect of heating on a bi-metallic strip.
3. To note the change in level of liquid in a container on heating and interpret the observations.
4. To study the effect of detergent on surface tension by observing capillary rise.
5. To study the factors affecting the rate of loss of heat of a liquid.
6. To study the effect of load on depression of a suitably clamped metre scale loaded (i) at its end (ii) in the middle.

NOTE : No question paper for practical work will be set by the Board.

Recommended book:

Physics Vol – 1 for class 11.
by Satish K. Gupta.
Modern Publishers,
Chancellor Commercial Hem Baruah Road,
Guwahati – 781001.

CLASS - 12
PHYSICS (Theory)

Unit-wise weightage
Theory Paper **Time: 3 Hrs.**
Marks: 70

Unit		Periods	Marks
I.	Electrostatics	25	08
II.	Current Electricity	22	08
III.	Magnetic effect of current & Magnetism	25	08
IV.	Electromagnetic Induction and Alternating current	19	08
V.	Electromagnetic Waves	5	03
VI.	Optics	30	12
VII.	Dual nature of Matter	8	04
VIII.	Atoms and Nuclei	18	07
IX.	Electronic Devices	18	07
X.	Communication Systems	10	05
	Total	**180**	**70**

Unit I : Electrostatics **25 periods**
(8 marks)

Electric Charges; Conservation of charge, Coulomb's law –force between two point charges, forces between multiple charges; superposition principle and continuous charge distribution.

Electric field, electric field due to a point charge, electric field lines; electric dipole, electric field due to a dipole; torque on a dipole in uniform electric field.

Electric flux, statement of Gauss's theorem and its applications to find field

electrostatic field.

Conductors and insulators, free charges and bound charges inside a conductor. Dielectrics and electric polarization, capacitors and capacitance, combination of capacitors in series and in parallel, capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor. Van de Graaff generator.

Unit II : Current Electricity 22 periods (8 marks)

Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, electrical resistance, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity.
Carbon resistors, colour code for carbon resistors; series and parallel combinations of resistors; temperature dependence of resistance.

Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel.
Kirchhoff's laws and simple applications. Wheatstone bridge, metre bridge. Potentiometer – principle and its applications to measure potential difference and for comparing emf of two cells; measurement of internal resistance of a cell.

Unit III : Magnetic Effects of Current and Magnetism 25 periods (8 marks)

Concept of magnetic field, Oersted's experiment.
Biot – Savart law and its application to current carrying circular loop.
Ampere's law and its applications to infinitely long straight wire, straight and toroidal solenoids.

Force on a moving charge in uniform magnetic and electric field. Cyclotron.
Force on a current-carrying conductor in a uniform magnetic field. Force between two parallel current-carrying conductors-definition of ampere. Torque experienced by a current loop in uniform magnetic field; moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter.

Current loop as a magnetic dipole and its magnetic dipole moment. Magnetic dipole moment of a revolving electron. Magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis. Torque on a magnetic dipole (bar magnet) in a uniform magnetic field; bar magnet as an equivalent solenoid, magnetic field lines; Earth's magnetic field and magnetic elements. Para, dia and ferro – magnetic substances, with examples. Electromagnets and Permanent magnets (elementary idea).

Unit IV: Electromagnetic Induction and Alternating Currents 19 periods (8 marks)

Electromagnetic induction; Faraday's law, induced emf and current; Lenz's law, Eddy currents. Self and mutual inductance.

Alternating currents, peak and rms value of alternating current/voltage; reactance and impedance; LC oscillations (qualitative treatment only), LCR

series circuit, resonance; power in AC circuits, wattless current. AC generator and transformer.

Unit V : Electromagnetic waves 5 periods
(3 marks)

Electromagnetic waves and their characteristics (qualitative ideas only). Elementary idea about displacement current. Transverse nature of electromagnetic waves.

Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.

Unit VI : Optics 30 periods
(12 marks)

Reflection of light, spherical mirrors, mirror formula. Refraction of light, total internal reflection and its applications, optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lens-maker's formula. Magnetification, power of a lens, combination of thin lenses in contact. Refraction and dispersion of light through a prism.

Scattering of light – blue colour of the sky and reddish appearance of the sun at sunrise and sunset.

Optical instruments: Human eye, image formation and accommodation, correction of eye defects (myopia, hypermetropia, presbyopia and astigmatism) using lenses. Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers (no derivation).

Wave optics: wave front and Huygens' principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygens' principle. Interference, Young's double slit experiment and expression for fringe width coherent sources and sustained interference of light. Diffraction due to single slit, width of central maximum. Resolving power of microscopes and astronomical telescopes. Polarisation, plane polarized light; Brewster's law, uses of plane polarized light and Polaroids.

Unit VII : Dual Nature of Matter and Radiation 8 periods
(4 marks)

Dual nature of radiation. Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light. Matter waves-wave nature of particles, de Broglie relation. Davisson-Germer experiment.

Unit VIII : Atoms & Nuclei 18 periods
(7 marks)

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum.

Composition and size of nucleus, atomic masses, isotopes, isobars; isotones. Radioactivity-alpha, beta and gamma particles/rays and their properties; radioactive decay law. Mass-energy relation, mass defect;

binding energy per nucleon and its variation with mass number; nuclear fission and fusion.

Unit IX : Electronic Devices 18 periods (7 marks)

Semiconductors; semiconductor diode – I-V characteristics in forward and reverse bias, diode as a rectifier; I-V characteristics of LED, photodiode, solar cell, and Zener diode; Zener diode as a voltage regulator. Junction transistor, transistor action, characteristics of a transistor; transistor as an amplifier (common emitter configuration) and oscillator. Logic gates (OR, AND, NOT, NAND and NOR). Transistor as a switch.

Unit X : Communication Systems 10 periods (5 marks)

Elements of a communication system (block diagram only); bandwidth of signals (speech, TV and digital data); bandwidth of transmission medium. Propagation of electromagnetic waves in the atmosphere, sky and space wave propagation. Need for modulation. Production and detection of an amplitude-modulated wave.

CLASS - 12
PHYSICS (Practical)

Every student will perform 8 experiments (4 from each section) & 6 activities (3 from each section) during the academic year. Two demonstration experiments must be performed by the teacher with participation of students. The students will maintain a record of these demonstration experiments.

Evaluation Scheme for Practical Examination:

15	One experiment from any one section		8 marks
16	Two activities (one from each section)	(4+4)	8 marks
17	Practical record (experiments & activities)		5 marks
18	Record of demonstration experiments & Viva based on these experiments		4 marks
19	Viva on experiments & activities		5 marks
	Total		**30 marks**

SECTION A

Experiments

1. To establish current – voltage relationship (Ohm's law) for a metallic conductor and find its resistance.
2. To determine resistance per cm of a given wire by plotting a graph of potential difference versus current.
3. To find resistance of a given wire using metre bridge and hence determine the specific resistance of its material.
4. To verify the laws of combination (series/parallel) of resistance using a

metre bridge.

5. To compare the emf of two given primary cells using potentiometer.
6. To determine the internal resistance of given primary cell using potentiometer.
7. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.
8. To convert the given galvanometer (of known resistance and figure of merit) into an ammeter and voltmeter of desired range and to verify the same.
9. To find the frequency of the a.c. mains with a sonometer.

Activities

1. To measure the resistance and impedance of an inductor with or without iron core.
2. To measure resistance, voltage (AC/DC), current (AC) and check continuity of a given circuit using multimeter.
3. To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.
4. To assemble the components of a given electrical circuit.
5. To study the variation in potential drop with length of a wire for a steady current.
6. To draw the diagram of a given open circuit comprising at least a battery, resistor/ rheostat, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram.

SECTION B

Experiments

1. To find the value of v for different values of u in case of a concave mirror and to find the focal length.
2. To find the focal length of a convex lens by plotting graphs between u and v or between $\frac{1}{u}$ and $\frac{1}{v}$
3. To find the focal length of a convex mirror, using a convex lens.
4. To find the focal length of a concave lens, using a convex lens.
5. To determine angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation.
6. To determine refractive index of a glass slab using a traveling microscope.
7. To find refractive index of a liquid by using (i) concave mirror, (ii) convex lens and (iii) plane mirror.
8. To draw the I-V characteristic curve of a p-n junction in forward bias and reverse bias.
9. To draw the characteristic curve of a zener diode and to determine its reverse break down voltage.
10. To study the characteristics of a common – emitter npn or pnp transistor and to find out the values of current and voltage gains.

Activities

1. To study effect of intensity of light (by varying distance of the source) on an L.D.R.
2. To identify a diode, an LED, a transistor, and IC, a resistor and a capacitor

from mixed collection of such items.

3. Use of multimeter to (i) identify base of transistor (ii) distinguish between npn and pnp type transistors (iii) see the unidirectional flow of current in case of a diode and an LED (iv) check whether a given electronic component (e.g. diode, transistor or IC) is in working order.
4. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
5. To observe polarization of light using two Polaroids.
6. To observe diffraction of light due to a thin slit.
7. To study the nature and size of the image formed by (i) convex lens (ii) concave mirror, on a screen by using a candle and a screen (for different distances of the candle from the lens/mirror).
8. To obtain a lens combination with the specified focal length by using two lenses from the given set of lenses.

NOTE: No question paper for practical paper will be set by the Board.

Recommended books:

1. *Modern abc of Physics, Classes 11 & 12* - *Modern Publishers.*
2. *Modern abc Practical Physics* - *Modern Publishers*

CLASS - 11
MUSIC (Theory)

Unit-wise weightage

Theory Paper **Time: 3 Hrs.** **Marks: 70**

Unit	Marks
I. Fundamentals of Music	45
II. Harmony	25
Total	**70**

Unit-I: Fundamentals of Music (45 marks)

1. Pitch notation including accidentals
2. Rhythm notation, meter, time signatures
3. Scales and key signatures
   - Accidentals
   - Major
   - Minor: natural, melodic, harmonic forms
   - Chromatic and pentatonic
   - Relative and tonic major and minor
4. Intervals
5. Triads
6. Musical markings, sign and symbols
7. Conducting beat patterns: simple and compound duple, triple, quadruple.

Unit-II: Harmony
(25 marks)

1. Write 3-part (3-voice) diatonic primary triads (I, IV, V in major and minor

keys) and their inversions in both clefs.
a. by letter name (ex: D, E_6 , Gm).
b. by roman numeral in key context with figured bass symbols, primary triads only (ex: key of F: V^5_3 , IV_6 , I^6_4).
c. by triad name/function (ex: key of G minor:
[1] tonic triad-1st inversion;
[2] dominant triad-root position).

2. Write 4-part root-position primary triads, and the tonic $^6_4$, in major and minor keys,with any triad tone in the soprano.

   (4-part chords to be written in "keyboard style", the style used in the FM textbook (3 notes in treble clef, bass note in bass clef), also termed "3 x 1" or "3 + 1" style.)

3. Write these 4-part cadences in major and minor keys.
   a. perfect authentic (UK name: perfect)
   b. half (UK name: imperfect)
   c. perfect plagal (the 'Amen' cadence)

4. Write 4-part chord progressions using root-position primary triads and the tonic $^6_4$, in major and minor keys.
   Ex:- A major: I V I IV I (start with 5th in the soprano).
   B major: I IV I^6_4 V I (start with 3rd in the soprano).
   C minor: i iv V I (start with root in the soprano).

Class-11
MUSIC (Practical)

Unit-wise weightage

Practical Paper **Time: 3 hours**
Marks: 30

Unit III	**Marks**
A. Individual exam	18
B. Group exam (Ear testing)	12
Total	**30**

A. Individual exam
(18 marks)

1. Be able to sing the following:
   a. Major scale up and down from any degree (ex: up from RE, down from TI).
   b. Minor scale up and down from the tonic only (3 forms).
   c. Melodic intervals up and down either from a given pitch or candidate's own pitch: major and minor 2nds, 3rds, 6ths; perfect unison, 4th, 5th, 8ve.

2. Be able to play the following on a keyboard:
   a. Individual notes (black and white) by key (letter) name.
   b. These major scales: C D F G A B-flat.

c. These major triads: C D E F G A B-flat.

B. Group exam (Ear testing). Be able to identify:
(12 marks)

1. Scales
    a. Major from any degree up or down.
    b. 3 forms of minor from the tonic only.
    c. Chromatic
    d. Pentatonic
2. Intervals – same as in A.1.c. above.
3. Meters: duple, triple, quadruple, fast compound duple (6/8 time).

NOTE : No question paper for practical work will be set by the Board.

Recommended books:

1. *FUNDAMENTALS OF MUSIC (4th ed), by Raymond Elliott, pub. PrenticeHall India.*
2. *MUSIC THEORY NOTEBOOK ONE (Class 9 text) and*
3. *MUSIC THEORY TEXTBOOK TWO (Class 10 text)*

CLASS - 12
MUSIC (Theory)

Unit-wise weightage

Theory Paper **Time: 3 Hrs.**
Marks: 70

Unit		Marks
I.	Harmony	25
II.	Music appreciation: Western and World music	30
III.	Church music	15
	Total	**70**

Unit-I: Harmony
(25 marks)

1. Write 3-part diatonic secondary triads (ii, iii, vi, vii), root position and 1st inversion in either clef in major keys only.
    a. by letter name (ex: Bm^{6}, Am^{+}, $F\#^{0}$).
    b. by roman numeral in key context with figured bass symbols (ex: key of G: vi, iii, ii).
    c. by triad name/function (ex: key of E major: [1] mediant-root position; [2] supertonic-1st inversion).

    (4-parts chords are to be written in "Keyboard style" (3 notes in treble clef, bass note in bass clef), the style used in the textbook [also termed "3 x 1" or "3 + 1" style]).

2. Write these 4-part secondary triads in major keys: mediant and submediant (root position) and supertonic (root position and 1st inversion), with any tone in the soprano.

(N.B. 4-part secondary triads in minor are not part of the syllabus).

3. Write the V7 chord in root position, in major and minor keys, with its correct resolution, on either staff; and in 4-part harmony (on 2 staves), root position with any tone in the soprano.

4. Write these 4-part chord progressions in any major key:

a. I iii IV ii^{6} I^{6}_{4} V7 I. (Start with the tonic in the soprano).
b. I vi ii V7 I (Start with the tonic in the soprano).
c. I vi IV V7 I (Start with any tone in the soprano).
(or V)

5. Non-harmonic tones (non-essential tones, non-chord tones).
   a. passing tone (PT) – diatonic and chromatic.
   b. neighbor tone (NT) – diatonic and chromatic.
   c. anticipation (A)
   (Be able to write an example of a NT. Be able to use PT and A in the chord progressions given in No.4 above).

Unit-II: Music Appreciation
(30 marks)

A. 1. Characteristics of musical tones
Pitch
Duration (length)
Intensity (dynamics)
Quality (tone colour/timbre)
2. Basic elements of music : Rhythm, Melody, Harmony.
3. Additional musical elements. Meter, Tempo, Tonality and mode, Modulation

B. Source of musical sound
1. Human voices
2. String instruments (chordophones)
3. Wind instruments (aerophones)
Woodwinds
Brass
4. Percussion instruments (membranophones, idiophones)
5. Keyboard – family
6. Electronic instruments (electrophones)

C. Musical textures
1. Monophony
2. Heterophony
3. Polyphony
4. Homophony

D. Musical forms: one part, binary, ternary, strophic, rondo, sonata-allegro, theme and variations.

E. Brief overview of Western music history from 1600 to 1900 AD.
1. Baroque (1600-1750)
   a. Musical characteristics: unity of mood, rhythm, melody, terrace dynamics, texture, figured bass.

b. Bach and Handel.

2. Classical period (1750-1828)
    c. Sonata
    d. Chamber music : string quartet
    e. Orchestral music: symphony, concerto
    f. Haydn, Mozart, Beethoven

3. Romantic period (1828-1900)
    g. Piano piece (Chopin)
    h. Programme music
    i. Nationalism in music
    j. Opera

4. Folk (traditional) music.

5. Other musical mediums: choirs bands.

F. Music in Non-Western Cultures
    1. Historical Perspective
        a. Cultural differences and similarities
        b. Cultural interchange
    2. Characteristics
        a. Timbre
        b. Texture
            i. Rhythmic polyphony
            ii. Diaphony
            iii. Call and response
        c. Duration
        d. Pitch
            i. Pentatonic scales
            ii. Microtones
        e. Dynamics

Unit-III: Church Music
(15 marks)

Philosophy of church music, music in worship and Christian education, and congregational singing, as covered in selected pages of the two church music textbooks, as under:

1. BIBLICAL FOUNDATIONS FOR CHURCH MUSIC
    Chapter 1 : 1-2, 7-8.
    Chapter 2 : bottom 19 to end 24.
    Chapter 4 : 38-40, bottom 42 to top 26.
    Chapter 7 : 75 to top 78.

2. INTRODUCTION TO CHURCH MUSIC
    Chapter 1 : bottom 8 to end 9 (points 1, 2, 3 only).
    Chapter 3 : 41-43; bottom 45 to top 46; 48-50.
    Chapter 9 : 111-112; top 114.

Chapter 10 : 119 to top 120; bottom 124 to 125; top 127.

Class - 12
MUSIC (Practical)

Unit-wise weightage

Practical Paper **Time: 30 minutes**
Marks: 30

Unit IV	**Marks**
A. Individual exam	18
B. Group exam	12
Total	**30**

A. Individual exam: Sight-singing and conducting.

1. Rhythm recitation: Recite the rhythm only of any voice part of two hymns or songs: (a) one in ¾ or 4/4 time (b) one in 6/8 time.

2. Sight-reading: Sing at sight two songs or hymns tunes in any major key up to 5 sharps or flats, in a simple meter: (a) the soprano part of one song/hymn tune.
(b) the alto, tenor, or bass part of another song/hymn tune.
(The songs/hymn tunes will normally be 8 measures long and include 1-2 accidentals.)

3. Conducting: Conduct one song in either triple, quadruple, or fast compound duple time/meter, as the examiner plays or sings along with the candidate.

B. Group exam: Melodic dictation in major keys only, up to 4 sharps or flats.
Write the pitches and rhythm of the melodies played by the examiner in either clef. (N.B. There will be no 6/8 time, triplets, or rests).

NOTE: No question paper for practical work will be set by the Board.

Recomended tbooks:

1. *FUNDAMENTALS OF MUSIC, 4th ed; by R. Elliott (Prentice-Hall India).*

2. *INTRODUCTION TO MUSIC by Ronald Pen*

3. *BIBLICAL FOUNDATIONS FOR CHURCH MUSIC, Joseph Green (Convention Press USA; reprinted in Nagaland).*

4. *INTRODUCTION TO CHURCH MUSIC, John F. Wilson (Moody Bible Institute, USA, reprinted in Nagaland).*

CLASS 11
BIOTECHNOLOGY

Objectives:

The broad objectives of teaching Biotechnology at highersecondary level are:

1 To help the learners know and understand basic facts and concepts in the subject at elementary stage.
2 To expose the students to different basic processes and basic techniques used in Biotechnology.
3 To familiarize the learners to understand the relationship of the subject to health, nutrition, environment, agriculture and industry, etc.
4 To develop conceptual competence in the learners so as to cope up with professional courses in future career.
5 To acquaint students with different applications of Biotechnology in everyday life.
6 To develop an interest in students to study biotechnology as a discipline.

CLASS 11
BIOTECHNOLOGY (Theory)

Unit-wise Weightage
Theory Paper **Time: 3 hours**
Marks: 70

Unit		Periods	Marks
1.	Introduction to Biotechnology	20	10
2.	Biomolecules	50	20
3.	Cell and development	55	20
4.	Genetics and Molecular Biology	55	20
	Total:	**180**	**70**

Unit I. Introduction to biotechnology **20 periods**
(10 marks)

(i). Overview

Definition, historical perspectives, Scope and importance, Commercial potential, an interdisciplinary challenge, A quantitative approach, classical vs modern concepts, Manufacturing quality control, Product safety, good manufacturing practices, Good laboratory practices, Biotechnology in India and global trends.

(ii). Fundamentals of biotechemical Engineering

Concept of pH, Buffer, Physical variables, Dimensions and units, Measurement conversions, Physical and chemical property data,

Stoichiometry, Errors in data and calculations, Absolute and relative uncertainty, Types of error, statistical analysis, Presentation of experimental data, data analysis, trends, Testing of mathematical models, goodness of fit, Use of graph paper with logarithmic coordinates, general procedure for plotting data, Process flow diagrams, Materials and energy balance, fluid flow and mixing, Heat transfer, Mass transfer, Unit operations, Homogeneous reactions, Heterogeneous reactions, Reactor engineering.

(iii) Biotechnology and society

Public perception, Role of science, engineering, arts, commerce, Patenting-Criterion for patents, discovery vs invention, Product and process patent, Reading a patent, National and International patent laws, Varietal protection, Patenting of biological systems, ethical issues in agriculture and health care.

Unit II Biomolecules 50 periods (20 marks)

(i) Nature of Biomolecules

Building blocks, functional groups found in biomolecules, Optical activity/stereochemistry, Conformation and Configuration, Chirality, Properties: Physical and chemical, biochemical transformation. Oxidation, Reduction, Cleavage of C-C bonds, Group (Supramolecular assembly), Biomolecular databases.

(ii) Structure and function

Nucleic acids-RNA and DNA and their structure, Proteins-the three dimensional structure, Function; Enzymes-Rate of enzymatic reactions, Enzymatic catalysis; Carbohydrates-structure and function, Metabolic pathways of breakdown of carbohydrates-Glycolysis, Glycogen metabolism; Transport through membranes, Citric acid cycle, Electron transport and oxidative phosphorylation; Fermentation; Photosynthesis-chloroplasts, light and dark reactions, Photophosphorylation, carbon dioxide fixation and synthesis of carbohydrates, Vitamins and Co-enzymes; Minerals, Lipid and Biological membranes, nitrogen metabolism.

(iii) Biochemical Techniques

Based on molecular weight: Vapour osmotic pressure, Centrifugation, Gel-permeation, electrophoresis, Mass-spectrometry, based on spectroscopy: Colorimetry, UV-VIS spectrophotometry, Flourescence, IR, X-rays; Based on charge/polarity: Partial chromatograph, Ion exchange, Iso electric focusing, Hydrophobic interaction; Based on solubility: salt precipitation, Organic solvent precipitation.

Unit III Cell and Development 55 periods (20 marks)

(i) The Basic Units of Life

Cell structure and components-Nucleus, Mitochondria, Choloroplasts, Ribosomes and other cell inclusions, various kinds of tissue and organs in animals and plants: evolution of populations (speciation) and Biodiversity; adaptation and natural selection; Organisation of life, Size and complexity-microbial, plant and animal world; Interaction with the environment.

(ii) Cell growth and Development

Cell division and cell cycle, cell communication and signal transduction pathways, Movement, Nutrition, Gas exchange, Internal transport, Maintaining the internal environment, Reproduction in microbes, plants, animals and humans; Animal and plant development, Apoptosis; Immune response in animal and humans; Defence mechanisms in plants, Plant-pathogen interaction, Secondary metabolism; defence strategies in microbes and insects.

(iii) Cellular Techniques

Microscopy, Centrifugation technique; Cell fractination and sorting; Cell growth determination; Mitotic index.

Unit IV Genetics and Molecular Biology 55 periods (20 marks)

(i) Principles of Genetics

Historical perspectives, Mendelian genetics; The role of chromosomes in inheritance, Multiple alleles, Linkage and crossing over, Genetic recombination; Genetic mapping, Gene interaction, sex-linked inheritance, Extranuclear inheritance, Quantitative inheritance, Genes at the population level, discovery of genetic material; Mutagenesis-genome, Chromosomal and gene mutations, Molecular mechanisms of mutation; Transposons; DNA repair, Genetic disorder, Plant and animal breeding.

(ii) Genome Function

Genome organisation, DNA replication, fine structure of gene, From gene to protein-Transcription, Genetic code and translation; Regulation of gene expression in prokaryotes and eukaryotes; Genetic basis for development; Genetics of cancer; Immunogenetics, Evolutionary genetics.

(iii) Genetical Techniques

Chromosomes techniques, chromosome stains, chromosome banding techniques, Karyotyping, chromosomes painting, Mutagenic techniques, Physical (UV, X rays/gamma rays) and chemical (NTG/EMS) mutagenesis; Recombination in bacteria; Breeding methods in plants; Pedigree analysis in humans; DNA isolations.

CLASS –11
BIOTECHNOLOGY (Practical)

Practical Paper **Time: 3 hours** **Marks: 30**

Unit		**Marks**
i.	Two experiments	20
ii.	Viva Voce	5
iii.	Practical record	5
	Total	**30**

Every student is required to do any eight experiments during the academic session.

7. Preparation of buffers and pH determination.
2. Sterilization techniques (Wet and Dry Sterilization, chemical sterilization and Ultrafiltration).
3. Media preparation (Solid and Liquid LB medium)
4. Isolation of bacteria from curd and staining of bacteria.
5. Determination of bacterial growth curve.
6. Study of various stages of mitosis and calculation of mitotic index.
7. Preparation of Karyotype.
8. Cell counting (using Haemocytometer).
9. Isolation of genomic DNA.
10. Detection of DNA by gel electrophoresis.
11. Isolation of milk protein (casein)
12. Estimation of protein by Biuret method.
13. Assaying the enzyme acid phosphate.

NOTE : No question paper for practical work will be set by the Board.

Recommended books:

1. *Biotechnology for class 11*
   by K. Kannan
   Foundation books Pvt. Ltd., Cambridge House, 4381/4, Ansari Road, Daryaganj, New Delhi – 110002.

2. *A Textbook of Biotechnology for class 11*
   by R. C. Dubey,
   S. Chand & Company Ltd, Ram Nagar,
   New Delhi – 110055.

CLASS 12
BIOTECHNOLOGY

Objectives:

7 To help the learners know and understand basic facts and concepts in the subject at elementary stage.
8 To expose the students to different basic processes and basic techniques used in Biotechnology.
9 To familiarize the learners to understand the relationship of the subject to health, nutrition, environment, agriculture and industry, etc.
10 To develop conceptual competence in the learners so as to cope up with professional courses in future career.
11 To acquaint students with different applications of Biotechnology in everyday life.
12 To develop an interest in students to study biotechnology as a discipline.

CLASS 12
BIOTECHNOLOGY (Theory)

Unit-wise weightage
Theory paper **Time: 3 hours**
Marks: 70

Unit		Periods	Marks
I.	Protein and Gene Manipulation	95	40
II.	Cell Culture Technology	85	30
Total		**180**	**70**

Unit I. Protein and Gene Manipulation **95 periods**
(40 marks)

(i) Protein Structure and Function

Introduction to the world of proteins; 3D shape of proteins, non- covalent bonds, hydrogen bonds, Van der Waals forces, hydrophobic interaction, Structure – function relationships in proteins, Chymotrypsin- a proteolytic enzyme, Molecular diseases- sickle cell anaemia; two dimensional gel electrophores, Purification of proteins, Initial recovery of proteins, aqueous two phase partition, scale up of purification, Bulk protein production, purification of proteins used for therapeutic or diagnostic purposes, Characterisation of proteins, Mass spectrometry (MALDI, Protein-based products, Blood products and vaccines, therapeutic antibodies and enzymes, therapeutic hormomes and growth factors, regulatory factors, analytical applications, industrial enzymes, Functional non-catalytic proteins, Neutraceutical proteins, Designing proteins by protein engineering, improving laundry detergent subtilism, Creation of novel proteins, Improving nutritional value of cereals and legumes- essential amino acid biological value, protein efficiency ratio, Proteomics, Genes and proteins- number of genes vs number of proteins, Type of proteomics, Expression

proteomics, Structural proteomics, Functional proteomics.

(ii) Recombinant DNA Technology

Introduction , Tools of recombinant DNA technology, Restriction enzymes, Other enzymes used in cloning, Cloning vectors – plasmids, bacteriophages, cosmids, YAC vector, BAC vectors, animal and plant viruses, Host cells making recombinant DNA, DNA library, Introduction of recombinant DNA into host cells, Identification of recombinants, PCR, DNA Probes, Hybridisation techniques, Southern blothing technique, DNA sequencing- Sanger's method, Site-directed mutagenesis.

(iii) Genomics and Bioinformatics

Introduction – Structural genomics, Functional genomics, Genome sequencing projects- Direct sequencing of BAC contigs, Random shotgun sequencing, The expression sequence tag approach; Gene prediction and gene counting, Gene prediction and counting, Genome similarity, SNPs and comparative genomics, Functional genomics- microarray technology, Fluorescence in situ hybridization, comparative cDNA hybridization microarray, History of bioinformatics, Sequences and Nomenclature, The IUPAC symbols, DNA and protein sequences, The concepts of directionality, Different type of sequences, Information sources-major databases, Data retrieval tools- BLAST family of search tools, Resources for gene level sequences, Analysis using bioinformatics tools.

Unit II Cell Culture Technology 85 periods (30 marks)

(i) Microbial Cell Culture and Applications

Introduction, Microbial cell culture techniques, Nutrients for microbial culture, Culture procedures (sterilization, enviroment for microbial growth, aeration and mixing), Equipment for microbial culture (baffle flask, shakers, fermentors), Types of microbial culture (bach culture, fed-batch culture and continuous culture), Measurement of kinetics of microbial growth, measurement of microbial growth, growth kinetic and specific growth rate, Scale-up of microbial process, Isolation of microbial products, Strain isolation and improvement, Strain isolation, Strain improvement (mutant selection, genetic engineering technique), Strain preservation, Culture collection centres, Application of microbial culture technology, Bioethics in microbial technology.

(ii) Plant Cell Culture and Applications

Introduction, Cell and tissue culture techniques, Basic techniques, Nutrients media, Type of cultures- organ culture, explant culture, callus culture, cell suspension culture, mass cell culture, protoplast culture, Plant regeneration pathways (organogenesis, somatic embroygenesis), Application of cell and tissue cultures, Micropropagation, Virus-free plants, Embryo rescue, Haploids and triploids, Somatic hybrids and cybrids, Production of Secondary metabolites, Somaclonal variation, In vitro plant germplasm conservation, Gene transfer methods in plants, Vector mediated gene transfer, Vector-less or direct gene transfer, Transgene analysis. Transgenic plants with beneficial trait, Stress tolerant (herbicide tolerance, insect resistance, virus resistance, fungi and bacteria abiotic stress tolerance), Delayed fruits ripening, Male sterility, Transgenic

plants as bioreactor i.e. molecular pharming (nutrient quality, seed protein quality, diagnostic and therapeutic proteins edible vaccines), biodegradable plastics, metabolic engineering and secondary products; Diagnostics in agriculture and molecular breeding, Bioethics in plant genetic engineering.

(iii) Animal Cell Culture and Applications

Introduction, Animal cell culture techniques, Features of animal cell growth in culture, Secondary cell culture and cell lines, Types of cell lines, Physical environment for culturing cells (temperature, pH, osmolarity, media, serum), Cryopreservation, Equipments required for animal cell culture (laminar air flow hoods, CO_2 incubator, centrifuge, inverted microscope), Characterisation of cell lines; Scale-up of animal culture process (roller bottles-microcarriers beads, spinner culture), Application of animal cultures, Tissue plasminogen activator (tPA), factor VIII, Erythropoietin, Hybridoma technology, Monoclonal antibiotics, OKT3, Stem cell technology, The morphological approach, in vitro clonal assay, Long term marrow culture, Embryonic stem cell culture, Cell and tissue engineering, Bioethics in Animal genetic engineering.

CLASS 12
BIOTECHNOLOGY (Practicals)

Practical Paper
Marks: 30

(Unit)		**Marks**
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	arks: 30□□□(Unit)□Mar	**ks**
	□□□□□Two experiment	s□1

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□□□□□Viva voce□4□□□□□□□Practical Record□4□□□□□□□Project work wri

Viva voce on project□5□□□□ **Total□30**□Every student is required to do any 8 (eight) experiments from the following.□1.Identification of N-terminal amino acid of a protein.□2. Isolation of an enzyme by Ion-exchange chromatography.□3. Analysis of protein by SDS-PAGE gel electrophoresis.□4. Plasmid Isolation.□5. Restriction digestion of DNA.□6. Transformation in Bacteria.□7. DNA sequencing.□8. Protoplast preparation and fusion.□9. Pregnancy testing.

10.□Experimentation in Bioinformatics.**Note:□□No question paper for practical work will be set by the Board.*Recommended Books:****Biotechnology for class 12 by K. Kannan Foundation books Pvt. Ltd., Cambridge House, 4381/4, Ansari Road, Darya***