ENGLISH (CORE)

Code No. 301

2024-25

Background

Students are expected to have acquired a reasonable degree of language proficiency in English Language by the time they come to class XI, and the course aims, essentially, at promoting the higher-order language skills.

For a large number of students, the higher secondary stage will be a preparation for the university, where a fairly high degree of proficiency in English may be required. Additionally, for another large group, the higher secondary stage may be a preparation for entry into the professional domain. The Core Course caters to both groups by promoting the language skills required for academic study as well as the language skills required for the workplace.

Competencies to be focused on:

The general objectives at this stage are to:

- listen and comprehend live as well as recorded oral presentations on a variety of topics
- develop greater confidence and proficiency in the use of language skills necessary for social and academic purpose to participate in group discussions and interviews, by making short oral presentation on given topics
- perceive the overall meaning and organisation of the text (i.e., correlation of the vital portions of the text)
- identify the central/main point and supporting details, etc., to build communicative competence in various lexicons of English
- promote advanced language skills with an aim to develop the skills of reasoning, drawing inferences, etc. through meaningful activities
- translate texts from mother tongue(s) into English and vice versa
- develop ability and acquire knowledge required in order to engage in independent reflection and enquiry
- read and comprehend extended texts (prescribed and non-prescribed) in the following genres: science fiction, drama, poetry, biography, autobiography, travel and sports literature,etc.
- text-based writing (i.e., writing in response to questions or tasks based on prescribed or unseen texts), understand and respond to lectures, speeches, etc.
- write expository / argumentative essays, explaining or developing a topic, arguing a case, etc, write formal/informal letters and applications for different purposes

- make use of contextual clues to infer meanings of unfamiliar vocabulary
- select, compile and collate information for an oral presentation
- produce unified paragraphs with adequate details and support
- use grammatical structures accurately and appropriately
- write items related to the workplace (minutes, memoranda, notices, summaries, reports etc.
- filling up of forms, preparing CV, e-mail messages., making notes from reference materials, recorded talks etc.

The core course should draw upon the language items suggested for class IX-X and delve deeper into their usage and functions. Particular attention may, however, be given to the following areas of grammar:

- The use of passive forms in scientific and innovative writings.
- Convert one kind of sentence/clause into a different kind of structure as well as other items to exemplify stylistic variations in different discourses modal auxiliaries- uses based on semantic considerations.

A. Specific Objectives of Reading

Students are expected to develop the following study skills:

- skim for main ideas and scan for details
- refer to dictionaries, encyclopedia, thesaurus and academic reference material in any format
- select and extract relevant information, using reading skills of skimming and scanning
- understand the writer's purpose and tone
- comprehend the difference between the literal and the figurative
- differentiate between claims and realities, facts and opinions, form business opinions on the basis of latest trends available
- comprehend technical language as required in computer related fields, arrive at personal conclusion and logically comment on a given text.
- Specifically develop the ability to be original and creative in interpreting opinion, develop the ability to be logically persuasive in defending one's opinion and making notes based on a text.

Develop literary skills as enumerated below:

- respond to literary texts
- appreciate and analyse special features of languages that differentiate literary texts from non-literary ones, explore and evaluate features of character, plot, setting, etc.
- understand and appreciate the oral, mobile and visual elements of drama. Identify the elements of style such as humour, pathos, satire and irony, etc.
- make notes from various resources for the purpose of developing the extracted ideas into sustained pieces of writing

B. Listening and Speaking

Speaking needs a very strong emphasis and is an important objective leading to professional competence. Hence, testing of oral skills must be made an important component of the overall testing pattern. To this end, speaking and listening skills are overtly built into the material to guide the teachers in actualization of the skills.

Specific Objectives of Listening & Speaking

Students are expected to develop the ability to:

- take organized notes on lectures, talks and listening passages
- listen to news bulletins and to develop the ability to discuss informally a wide ranging issues like current national and international affairs, sports, business, etc.
- respond in interviews and to participate in formal group discussions.
- make enquiries meaningfully and adequately and to respond to enquiries for the purpose of travelling within the country and abroad.
- listen to business news and to be able to extract relevant important information.
- to develop public speaking skills.

C. Specific Objectives of Writing

The students will be able to:

- write letters to friends, relatives, etc. to write business and official letters.
- open accounts in post offices and banks. To fill in railway/airline reservation forms.
- draft notices, advertisements and design posters effectively and appropriately
- write on various issues to institutions seeking relevant information, lodge complaints, express gratitude or render apology.
- write applications, fill in application forms, prepare a personal bio-data for admission into colleges, universities, entrance tests and jobs.
- write informal reports as part of personal letters on functions, programmes and activities held in school (morning assembly, annual day, sports day, etc.)
- write formal reports for school magazines/events/processes/ or in local newspapers about events or occasions.
- express opinions, facts, arguments in the form of speech or debates, using a variety of accurate sentence structures
- draft papers to be presented in symposia.
- take down notes from talks and lectures.
- write examination answers according to the requirement of various subjects.
- summarise a text.

Note: The creative writing section shall assess the prescribed competencies for writing skills, irrespective of any word limit.

D. More About Reading

Inculcating good reading habits in children has always been a concern for all stakeholders in education. The purpose is to create independent thinking individuals with the ability to not only create their own knowledge but also critically interpret, analyse and evaluate it with objectivity and fairness. This will also help students in learning and acquiring better language skills.

Creating learners for the 21st century involves making them independent learners who can learn, unlearn and relearn. If our children are in the habit of reading, they will learn to reinvent themselves and deal with the many challenges that lie ahead of them.

Reading is not merely decoding information or pronouncing words correctly. It is an interactive dialogue between the author and the reader in which the reader and the author share their experiences and knowledge with each other. Good readers are critical readers with an ability to arrive at a deeper understanding of not only the world presented in the book but also of the real world around them.

Consequently, they become independent thinkers capable of taking their own decisions in life rationally. Hence, a few activities are suggested below which teachers may use as a part of the reading project.

- Short review / dramatization of the story
- Commentary on the characters
- Critical evaluation of the plot, storyline and characters
- Comparing and contrasting the characters within the story, with other characters in stories by the same author or by different authors
- Extrapolating about the story read or life of characters after the story ends defending characters' actions in the story
- Making an audio story out of the novel/text to be read aloud.
- Interacting with the author
- Holding a literature fest where students role-play as various characters to interact with each other
- Role playing as authors/poets/dramatists, to defend their works and characters
- Symposiums and seminars for introducing a book, an author, or a theme
- Creating graphic novels out of novel or short stories they read
- Dramatizing incidents from a novel or a story
- Creating their own stories
- Books of one genre to be read by the whole class.

Teachers may select books and e-books suitable to the age and level of the learners. Care ought to be taken to choose books that are appropriate in terms of language, theme and content and which do not hurt the sensibilities of a child.

Teachers may later suggest books from other languages by dealing with the same themes as an extended activity. The Project should lead to independent learning/reading skills and hence the chosen book should not be taught in class, but may be introduced through activities and be left for the students to read at their own pace. Teachers may, however, choose to assess a student's progress or success in reading the book by asking for verbal or written progress reports, looking at their diary entries, engaging in a discussion about the book, giving a short quiz or a work sheet about the book/short story. A befitting mode of assessment may be chosen by the teacher.

Methods and Techniques

The techniques used for teaching should promote habits of self-learning and reduce dependence on the teacher. In general, we recommend a multi-skill, learner-centred, activity based approach, of which there can be many variations.

- The core classroom activity is likely to be that of silent reading of prescribed/selected texts for comprehension, which can lead to other forms of language learning activities such as role-play, dramatization, group discussion, writing, etc., although many such activities could be carried out without the preliminary use of textual material.
- It is important that students be trained to read independently and intelligently, interacting actively with texts, with the use of reference materials (dictionary, thesaurus, etc.) where necessary.
- Some pre-reading activity will generally be required, and the course books should suggest suitable activities, leaving teachers free to devise other activities when desired. So also, the reading of texts should be followed by post reading activities.
- It is important to remember that students should be encouraged to interpret texts in different ways.
- Group and pair activities can be resorted to, when desired, although many useful language activities can be carried out individually. In general, teachers should encourage students to interact actively with texts and with each other.
- Oral activity (group discussion, etc.) should be encouraged.

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Section A – 26 Marks
Reading Skills

I Reading Comprehension through Unseen Passages **(10+8=18 Marks)**

1. One unseen passage to assess comprehension, interpretation, analysis, inference and vocabulary. The passage may be factual, descriptive or literary.
2. One unseen **case-based factual** passage with verbal/visual inputs like statistical data, charts etc.to assess comprehension, interpretation, analysis, inference and evaluation.

Note: The combined word limit for both the passages will be 600-750.

Multiple Choice Questions / Objective Type Questions will be asked.

3. Note Making and Summarization based on a passage of approximately 200-250 words.

i.	Note Making:		**5 Marks**
	◦ Title:	1	
	◦ Numbering and indenting:	1	
	◦ Key/glossary:	1	
	◦ Notes:	2	
ii.	Summary (up to 50 words):		**3 Marks**
	◦ Content:	2	
	◦ Expression:	1	

Section B – 23 Marks
Grammar and Creative Writing Skills

II Grammar **7 Marks**

4. Questions on Gap filling (Tenses, Clauses)
5. Questions on re-ordering/transformation of sentences

(Total seven questions to be done out of the eight given).

III Creative Writing Skills **16 Marks**

6. Short writing task – Classified Advertisements, up to 50 words. One out of the two given questions to be answered **(3 Marks**: Format: 1 / Content: 1 / Expression: 1)
7. Short writing task –Poster up to 50 words. One out of the two given questions to be answered. (**3 marks:** Format: 1 / Content: 1 / Expression: 1)
8. Long Writing task: Speech in 120-150 words based on verbal / visual cues related to contemporary / age-appropriate topic. One out of the two given questions to be answered. **(5 Marks**: Format: 1 / Content: 2 / Expression: 2)
9. Long Writing Task: Debate based on visual/verbal inputs in 120-150 words, thematically related to contemporary, topical issues. One out of the two given questions to be answered. **(5 Marks**: Format: 1 / Content: 2 / Expression: 2)

Section C – 31 Marks
Literature Text Book and Supplementary Reading Text

This section will have variety of assessment items including Multiple Choice Questions, Objective Type Questions, Short Answer Type Questions and Long Answer Type Questions to assess comprehension, interpretation, analysis, evaluation and extrapolation beyond the text.

10. One Poetry extract out of two, from the book **Hornbill,** to assess comprehension, interpretation, analysis, inference and appreciation. **(3x1=3 Marks)**
11. One Prose extract out of two, from the book **Hornbill,** to assess comprehension, interpretation, analysis, evaluation and appreciation. **(3x1=3 Marks)**
12. One prose extract out of two, from the book **Snapshots,** to assess comprehension, interpretation, analysis, inference and appreciation. **(4x1=4 Marks)**
13. Two Short answer type questions (one from Prose and one from Poetry, from the book **Hornbill**), outof four, to be answered in 40-50 words. Questions should elicit inferential responses through critical thinking. **(3x2=6 Marks)**
14. One Short answer type question, from the book **Snapshots,** to be answered in 40- 50 words. Questions should elicit inferential responses through critical thinking. One out of two questions to be done. **(3x1=3 Marks)**
15. One Long answer type question, from **Prose/Poetry of Hornbill,** to be answered in 120-150 words. Questions can be based on incident / theme / passage / extract / event, as reference points to assess extrapolation beyond and across the text. The question will elicit analytical and evaluative response from the student. Any one out of two questions to be done. **(1x6=6 Marks)**
16. One Long answer type question, based on the chapters from the book **Snapshots,** to be answered in 120-150 words, to assess global comprehension and extrapolation beyond the text. Questions to provide analytical and evaluative responses, using incidents, events, themes, as reference points. Any one out of two questions to be done. **(1x6=6 Marks)**

Prescribed Books

1. **Hornbill:** English Reader published by National Council of Education Research and Training, New Delhi

- The Portrait of a Lady (Prose)
- A Photograph (Poem)
- "We're Not Afraid to Die… if We Can Be Together
- Discovering Tut: The Saga Continues
- The Laburnum Top (Poem)
- The Voice of the Rain (Poem)
- Childhood (Poem)
- The Adventure
- Silk Road (Prose)
- Father to Son

2. **Snapshots:** Supplementary Reader published by National Council of Education Research and Training, New Delhi

- The Summer of the Beautiful White Horse (Prose)
- The Address (Prose)
- Mother's Day (Play)
- Birth (Prose)
- The Tale of Melon City

INTERNAL ASSESSMENT

Assessment of Listening Skills	- 05 marks.
Assessment of Speaking Skills	- 05 Marks
Project Work	- 10 Marks

Question Paper Design

English CORE XI (Code No. 301)
2024-25

Section	Competencies	Total marks
Reading Skills	Conceptual understanding, decoding, Analyzing, inferring, interpreting, appreciating, literary, conventions and vocabulary, summarizing and using appropriate format/s.	26
Grammar and Creative Writing Skills	Conceptual Understanding, application of rules, Analysis, Reasoning, appropriacy of style and tone, using appropriate format and fluency, inference, analysis, evaluation and creativity.	23
Literature Text Book and Supplementary Reading Text	Recalling, reasoning, appreciating literary convention, inference, analysis, creativity with fluency, Critical Thinking.	31
	TOTAL	**80**
Internal Assessment	Assessment of Listening and Speaking Skills • Listening • Speaking	**10** 5+5
	• Project Work	**10**
	GRAND TOTAL	**100**

ENGLISH CORE CODE NO. 301
CLASS – XII
2024-25

Section A **22 Marks**

Reading Skills

I Reading Comprehension through Unseen Passage **(12+10 = 22 Marks)**

1. One unseen passage to assess comprehension, interpretation, analysis and inference. Vocabulary assessment will also be assessed via inference. The passage may be factual, descriptive or literary.
2. One unseen **case-based factual** passage with verbal/visual inputs like statistical data, charts etc. to assess comprehension, interpretation, analysis, inference and evaluation.

Note: The combined word limit for both the passages will be 700-750 words.

Multiple Choice Questions / Objective Type Questions and Short Answer Type Questions (to be answered in 40-50 words) will be asked.

Section B **18 Marks**

Creative Writing Skills

II. Creative Writing Skills

3. Notice, up to 50 words. One out of the two given questions to be answered. **(4 Marks**: Format :1 / Content: 2 / Accuracy of Spelling and Grammar: 1).
4. Formal/Informal Invitation and Reply, up to 50 words. One out of the two given questions to be answered.
   (4 Marks: Format: 1 / Content: 2 / Accuracy of Spelling and Grammar :1).
5. Letters based on verbal/visual input, to be answered in approximately 120-150 words. Letter types include application for a job with bio data or resume. Letters to the editor (giving suggestions or opinion on issues of public interest). One out of the two given questions to be answered.
   (5 Marks: Format: 1 / Organisation of Ideas: 1/Content: 2 / Accuracy of Spelling and Grammar :1).
6. Article/ Report Writing, descriptive and analytical in nature, based on verbal inputs, to be answered in 120-150 words. One out of the two given questions to be answered. **(5 Marks**: Format: 1 /Organisation of Ideas: 1/Content: 2 / Accuracy of Spelling and Grammar :1).

Section C 40 Marks

Literature Text Book and Supplementary Reading Text

This section will have variety of assessment items including Multiple Choice Questions, Objective Type Questions, Short Answer Type Questions and Long Answer Type Questions to assess comprehension, interpretation, analysis, evaluation and extrapolation beyond the text.

7. One Poetry extract out of two, from the book **Flamingo,** to assess comprehension, interpretation, analysis, inference and appreciation. **(6x1=6 Marks)**

8. One Prose extract out of two, from the book **Vistas,** to assess comprehension, interpretation, analysis, evaluation and appreciation. **(4x1=4 Marks)**

9. One prose extract out of two from the book **Flamingo,** to assess comprehension, interpretation, analysis, inference and evaluation. **(6x1=6Marks)**

10. Short answer type questions **(from Prose and Poetry from the book Flamingo**), to be answered in 40-50 words each. Questions should elicit inferential responses through critical thinking. Five questions out of the six given, are to be answered. **(5x2=10 Marks)**

11. Short answer type questions, from **Prose (Vistas)**, to be answered in 40- 50 words each. Questions should elicit inferential responses through critical thinking. Any two out of three questions to be done. **(2x2=4 Marks)**

12. One Long answer type question, from **Prose**/**Poetry (Flamingo)**, to be answered in 120-150 words. Questions can be based on incident / theme / passage / extract / event as reference points to assess extrapolation beyond and across the text. The question will elicit analytical and evaluative response from the student. Any one out of two questions to be done. **(1x5=5 Marks)**

13. One Long answer type question, based on the chapters from the book **Vistas**, to be answered in 120-150 words, to assess global comprehension and extrapolation beyond the text. Questions to provide analytical and evaluative responses using incidents, events, themes, as reference points. Any one out of two questions to be done. **(1x5=5 Marks)**

Prescribed Books

1. **Flamingo:** English Reader published by National Council of Education Research and Training, New Delhi

(Prose)

- The Last Lesson Lost Spring Deep Water
- The Rattrap
- Indigo
- Poets and Pancakes
- The Interview
- Going Places

(Poetry)

- My Mother at Sixty-Six
- Keeping Quiet
- A Thing of Beauty
- A Roadside Stand
- Aunt Jennifer's Tigers

2. **Vistas:** Supplementary Reader published by National Council of Education Research and Training, New Delhi

- The Third Level
- The Tiger King
- Journey to the End of the Earth
- The Enemy
- On the Face of It Memories of Childhood
- The Cutting of My Long Hair
- We Too are Human Beings

INTERNAL ASSESSMENT

Assessment of Listening Skills	- 05 marks.
Assessment of Speaking Skills	- 05 Marks
Project Work	- 10 Marks

Question Paper Design Code No. 301
2024-25

English CORE XII

Section	Competencies	Total marks
Reading Skills	Conceptual understanding, decoding, Analyzing, inferring, interpreting, appreciating, literary, conventions and vocabulary, summarizing and using appropriate format/s.	22
Creative Writing Sills	Conceptual Understanding, application of rules, Analysis, Reasoning, appropriacy of style and tone, using appropriate format and fluency, inference, analysis, evaluation and creativity.	18
Literature Text Book and Supplementary Reading Text	Recalling, reasoning, critical thinking, appreciating literary convention, inference, analysis, creativity with fluency.	40
	TOTAL	**80**
Internal Assessment	Assessment of Listening and Speaking Skills • Listening • Speaking	**10** 5+5
	• Project Work	**10**
	GRAND TOTAL	**100**

Annexure I

Guidelines for Internal Assessment

Classes XI-XII

ALS must be seen as an integrated component of all four language skills rather than a compartment of two. Suggested activities, therefore, take into consideration an integration of the four language skills but during assessment, emphasis will be given to speaking and listening, since reading and writing are already being assessed in the written exam.

Classes XI-XII Total Marks: 20

Assessment of Listening and Speaking Skills: (5+5=10 Marks)

i. **Activities:**

- Subject teachers must refer to books prescribed in the syllabus.
- In addition to the above, teachers may plan their own activities and create their own material for assessing the listening and speaking skills.

ii. **Parameters for Assessment:** The listening and speaking skills are to be assessed on the following parameters:

a. Interactive competence (Initiation & turn taking, relevance to the topic)

b. Fluency (cohesion, coherence and speed of delivery)

c. Pronunciation

d. Language (grammar and vocabulary)

A suggestive rubric is given below:

	1	2	3	4	5
Interaction	• Contributions are mainly unrelated to those of other speakers • Shows hardly any initiative in the development of conversation • Very limited interaction	• Contributions are often unrelated to those of the other speaker • Generally passive in the development of conversation	• Develops interaction adequately, makes however minimal effort to initiate conversation • Needs constant prompting to take turns	• Interaction is adequately initiated and developed • Takes turn but needs some prompting	• Initiates & logically develops simple conversation on familiar topics • Takes turns appropriately
Fluency & Coherence	• Noticeably/ long pauses; rate of speech is slow • Frequent repetition and/or self- correction this is all right in informal conversation • Links only basic sentences; breakdown of coherence	• Usually fluent; produces simple speech fluently, but loses coherence in complex communicatio n • Often hesitates and/or resorts to slow	• Is willing to speak at length, however repetition is noticeable • Hesitates and/or self corrects; occasionally loses coherence	• Speaks without noticeable effort, with a little repetition • Demonstrates hesitation to find words or use correct grammatical structures and/or self-correction	• Speaks fluently almost with no repetition & minimal hesitation Develops topic fully & coherently

	evident	speech • Topics partly developed; not always concluded logically	• Topics developed, but usually not logically concluded	• Topics not fully developed to merit.	
Pronunciation	• Frequent inaccurate pronunciation • Communication is severely affected	• Frequently unintelligible articulation • Frequent phonological errors • Major communication problems	• Largely correct pronunciation &clear articulation except occasional errors	• Mostly correct pronunciation & clear articulation • Is clearly understood most of the time; very few phonological errors	• Pronounces correctly & articulates clearly • Is always comprehensible • uses appropriate intonation
Vocabulary & Grammar	• Demonstrates almost no flexibility, and mostly struggles for appropriate words • Many Grammatical errors impacting communication	• Is able to communicate on some of the topics, with limited vocabulary. • Frequent errors, but self- corrects	• Is able to communicate on most of the topics, with limited vocabulary. A few grammatical errors	• Is able to communicate on most of the topics with appropriate vocabulary • Minor errors that do not hamper communication	• Is able to communicate on most of the topics using a wide range of appropriate vocabulary, using new words and expressions No grammatical errors

iii. Schedule:

- The practice of listening and speaking skills should be done throughout the academic year.
- The final assessment of the skills is to be done as per the convenience and schedule of the school.

Project Work + Viva: 10 Marks

Out of ten marks, 5 marks will be allotted for the project report/script /essay etc. and 5 marks for the viva

I. Schedule:

- Schools may refer to the suggestive timeline given in these guidelines for the planning, preparation and viva-voce of ALS based projects.
- The final assessment of the skills may be done on the basis of parameters suggested by the Board. Language teachers, however, have the option to adopt/ modify these parameters according to their school specific requirements.

II. Suggestions for Project Work:

- The Project can be inter-disciplinary in theme. The ideas/issues highlighted in the chapters/ poems/ drama given the prescribed books can also be developed in the form of a project. Students can also take up any relevant and age-appropriate theme.
- Such topics may be taken up that provide students with opportunities for listening and speaking. Some suggestions are as follows:

a) **Interview-Based research:**

Example:

- Students can choose a topic on which to do their research/ interview, e.g. a student can choose the topic: "Evolving food tastes in my neighbourhood" or "Corona pandemic and the fallout on families." Read the available literature.
- The student then conducts interviews with a few neighbours on the topic. For an interview, with the help of the teacher, student will frame questions based on the preliminary research/background.
- The student will then write an essay/ write up / report etc. up to 1000 words on his/her research and submit it. He/ She will then take a viva on the research project. The project can be done in individually or in pairs/ groups

b) Students listen to podcasts/ interviews/radio or TV documentary on a topic and prepare a report countering or agreeing with the speakers. Write an 800 - 1000 words report and submit. Take a viva on the report.

c) Students create their own video/ Audio, after writing a script. Before they decide a format, the following elements can be taken into consideration:

- Theme/topic of the audio / video. Would the child like to pick a current issue or something artistic like theatre?
- What are the elements that need to be part of the script?
- Will the video/audio have an interview with one or more guests?
- Would they prefer to improvise while chatting with guests, or work from a script?
- What would be the duration?
- How would they present the script/report to the teacher, e.g. Can it be in the form of a narrative?

d) **Students** write**, direct and present a theatrical production, /One act play**
This will be a project which will be done as a team. It will involve planning, preparation and presentation. In short, various language skills will be utilised. There will be researching, discussion, writing the script, auditioning and ultimately producing the play. The project will end with a presentation and subsequently a viva. Teachers will be able to assess the core language skills of the students and help them grow as 21st century critical thinkers.

III. Instructions for the Teachers: -

1. **Properly orient students about the Project work, as per the present Guidelines.**
2. **Facilitate the students in the selection of theme and topic.**
3. Create a rubric for assessment and share with the students before they start so that they know the parameters of assessment:

- Teachers need to familiarize themselves with the method of assessing students with the rubric-- a table with different criteria and a grading scale.
- Choose the criteria on which you will grade students and list them along the left side of the page.
- Create an even number of columns along the top of the page. These columns will represent potential skill levels of the students.
- Assessing students on four/five criteria is an easy way to begin. For each criterion, define the ability that student would exhibit at each of the levels.
- The more detailed you make your criteria, the easier it will be to evaluate each student and define the level at which the student is presenting.

{Sample Rubric is attached at the end for reference}

IV. Parameters for Overall Assessment: -

1. **Pronunciation**:

- When evaluating the pronunciation of the students, teachers must listen for clearly articulated words, pronunciation of unusual spellings and intonation.
- Assess the students for the pronunciation skills and determine at which level the student needs improvement.

2. **Vocabulary**:

After noting their pronunciation levels, evaluate the students on the use of extensive and appropriate **vocabulary** during the viva. Check if students are using vocabulary appropriate to the context about which they are speaking.

3. **Accuracy**:

Grammar has always been an important component of language skills. As students speak/ answer the questions during the viva, listen to their **grammatical structures**. Are they competent enough to use multiple tenses? Is their word order correct in a given sentence? An effective speaker will automatically use the correct grammatical structures of his language.

4. **Communication**:

Assessing the **communication skills** of the students means looking at more than language. Look at how creatively students use the language to make their points understood. Students with a low level of vocabulary and grammar may still have good communication skills if they are able to make the teacher understand their point of view.

5. **Interaction**:

- During the viva teachers need to ask the students some questions. Questions need to be based on the projects that have been suggested or chosen by the students.
- It is imperative for a teacher to read the essays/project reports before they can be ready to ask questions.
- Teachers need to observe how students answer the questions that are posed to them: Are they able to understand and answer questions independently or can they answer only when the questions are translated into simpler words or repeated? Are they able to give appropriate responses in a conversation?
- These elements of **interaction** are necessary for clear and effective communication. A student with effective interaction skills will be able to answer questions with relative ease and follow the flow of conversation.

6. **Fluency**:

- Fluency may be the easiest quality to judge in the students' speech: How comfortable are they as they speak and express themselves? How easily do the words come out? Are there inappropriate pauses and gaps in the way a student speaks?
- **Fluency** is a judgement of this communication and is an important criterion when evaluating speaking skills. These criteria: pronunciation, vocabulary, accuracy, interaction and fluency are all the hallmarks of a student's overall speaking abilities.
- Teachers must also remember that some **students may excel in one area and struggle in another**. Helping the students understand these issues will enable them to become effective

speakers in future. Let your students know that you will be assessing them in these various areas when you evaluate their progress and encourage them to work and improve in these areas.

- **Finally,** teachers must remember that a proper evaluation of the students will take into consideration **more than just one oral interview on the final ASL** project. Teachers must take note of a student's progress throughout the academic year.

V. Project-Portfolio/ Project Report

The **Project-Portfolio/Project Report** is a compilation of the work that the students produce during the process of working on their ALS Project.

The Project-Portfolio may include the following:

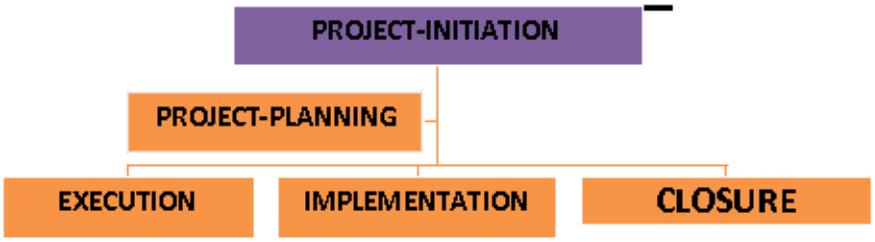
- Cover page, with title of project, school details/details of students.
- Statement of purpose/objectives/goals
- Certificate of completion under the guidance of the teacher.
- Students Action Plan for the completion of assigned tasks.
- Materials such as scripts for the theatre/role play, questionnaires for interview, written assignments, essays, survey-reports and other material evidence of learning progress and academic accomplishment.
- The 800-1000 words essay/Script/Report.
- Student/group reflections.
- If possible, Photographs that capture the positive learning experiences of the student(s).
- List of resources/bibliography

The following points must be kept for consideration while assessing the project portfolios:

- Quality of content of the project
- Accuracy of information
- Adherence to the specified timeline
- Content in respect of (spellings, grammar, punctuation)
- Clarity of thoughts and ideas
- Creativity
- Contributions by group members
- Knowledge and experience gained

VI. Suggestive Timeline:

The FIVE Steps in Project Plan



Month	Objectives
Planning and Research for the Project Work **Preferably till November-December**	• Teachers plan a day to orient students about the ALS projects, details are shared with all stakeholders. • Students choose a project, select team members and develop project- plan. • Group meets (preferably online) and reports to the team leader about the progress: shortfalls and successes are detailed. • Team leader apprises teacher-mentor. • Students working individually or in pairs also update the teachers. • A logical, deliverable and practical plan is drafted by the team/ pair/individual. Goals/objectives are clearly defined for all. • Work is delegated to team members by the team leader. Students wishing to work alone develop their own plan of Action. • Detailed project schedules are shared with the teacher.
December-January	• Suggestions and improvements are shared by the teacher, wherever necessary. • Group members coordinate and keep communication channels open for interaction. • Gaps (if any) are filled with the right skill sets by the Team Leader/ individual student. • The final draft of the project portfolio/ report is prepared and submitted for evaluation.
January-February	• Students are assessed on their group/pair/individual presentations on allotted days. Final Viva is conducted by the External/Internal examiner.
February-March or as per the timelines given by the Board	• Marks are uploaded on the CBSE website.

SAMPLE RUBRIC FOR ALS Project Work (For Theatre/Role Play/Oral presentation/Interview/Podcast)

CATEGORY	1	2	3	4	5
TIME LIMIT	Presentation is less than or more than 5 minutes long	Presentation exceeded or less than specified time limit by 4 to 5minutes	Presentation exceeded or less than specified time limit by 3 to 4 minutes	Presentation exceeded or less than specified time limit by 2 to 3 minutes	Student/ group adhered to the given time limit
CONTENT/SCRIPT/ QUESTIONNAIRE	Script is not related to topic or issue	Well written script/content shows little understanding of parts of topic	Well written script/content shows good understanding of parts of topic	Well written script/content shows a good understanding of subject topic	Well written script/content shows full understanding of subject topic
CREATIVITY	No props/costumes/ stage presentation lack-lustre	Some work done, average stage set- up and costumes	Well organized presentation, could have improved	Logical use of props , reasonable work done, creative	Suitable props /honest effort seen/ considerable work done/ Creative and relevant costumes
PREPAREDNESS	Student/group seems to be unprepared	Some preparedness visible, but Rehearsal is lacking	Somewhat prepared, rehearsal is lacking	Good preparedness, but need better rehearsal	Complete preparedness/ rehearsed presentation
CLARITY OF SPEECH	Lack of clarity in presentation many words mispronounced	Speaks clearly, some words are mispronounced	Speaks clearly 90% of the time/ a few mispronounced words	Speaks clearly and distinctly 95% of time/ few mispronounced words	Speaks clearly distinctly 95% of time/ fluency in pronunciation
USE OF PROPS (Theatre/Role Play)	Only 1/no relevant props used	1 to 2 relevant props used	2 to 3 relevant props used	3 to 4 relevant props used	4 to 5 relevant props used
EXPRESSION/ BODY LANGUAGE	Very little use of Facial expressions /body language, does not Generate much interest	Little Use of facial expressions and body language	Facial expressions and body Language are used to try to generate some enthusiasm	Facial expression and body language sometimes generate strong enthusiasm with the topic	Facial expression and body language generate strong enthusiasm with the topic
PORTFOLIO-PRESENTATION	Inadequate & unimpressive	Somewhat suitable & convincing	Adequate & relevant	Interesting, enjoyable & relevant	Brilliant, creative& exceptional

Assessment of Activity Work:

Throughout the year any 10 activities shall be performed by the student from the activities given in the NCERT Laboratory Manual for the respective class (XI or XII) which is available on the link: http://www.ncert.nic.in/exemplar/labmanuals.htmla record of the same may be kept by the student. An year end test on the activity may be conducted

The weightage are as under:

- The activities performed by the student throughout the year and record keeping : 5 marks
- Assessment of the activity performed during the year end test: 3 marks
- Viva-voce: 2 marks

Prescribed Books:

1) Mathematics Textbook for Class XI, NCERT Publications
2) Mathematics Part I - Textbook for Class XII, NCERT Publication
3) Mathematics Part II - Textbook for Class XII, NCERT Publication
4) Mathematics Exemplar Problem for Class XI, Published by NCERT
5) Mathematics Exemplar Problem for Class XII, Published by NCERT
6) Mathematics Lab Manual class XI, published by NCERT
7) Mathematics Lab Manual class XII, published by NCERT

Conduct of Periodic Tests:

Periodic Test is a Pen and Paper assessment which is to be conducted by the respective subject teacher. The format of periodic test must have questions items with a balance mix, such as, very short answer (VSA), short answer (SA) and long answer (LA) to effectively assess the knowledge, understanding, application, skills, analysis, evaluation and synthesis. Depending on the nature of subject, the subject teacher will have the liberty of incorporating any other types of questions too. The modalities of the PT are as follows:

a) **Mode:** The periodic test is to be taken in the form of pen-paper test.

b) **Schedule:** In the entire Academic Year, three Periodic Tests in each subject may be conducted as follows:

Test	Pre Mid-term (PT-I)	Mid-Term (PT-II)	Post Mid-Term (PT-III)
Tentative Month	July-August	November	December-January

This is only a suggestive schedule and schools may conduct periodic tests as per their convenience. The winter bound schools would develop their own schedule with similar time gaps between two consecutive tests.

c) **Average of Marks**: Once schools complete the conduct of all the three periodic tests, they will convert the weightage of each of the three tests into ten marks each for identifying best two tests. The best two will be taken into consideration and the average of the two shall be taken as the final marks for PT.

d) The school will ensure simple documentation to keep a record of performance as suggested in detail circular no.Acad-05/2017.

e) **Sharing of Feedback/Performance**: The students' achievement in each test must be shared with the students and their parents to give them an overview of the level of learning that has taken place during different periods. Feedback will help parents formulate interventions (conducive ambience, support materials, motivation and morale-boosting) to further enhance learning. A teacher, while sharing the feedback with student or parent, should be empathetic, non- judgmental and motivating. It is recommended that the teacher share best examples/performances of IA with the class to motivate all learners.

MATHEMATICS (Code No. - 041)

QUESTION PAPER DESIGN CLASS - XII

(2024-25)

Time: 3 hours **Max. Marks: 80**

S. No.	Typology of Questions	Total Marks	% Weightage
1	**Remembering:** Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. **Understanding:** Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	44	55
2	**Applying:** Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	20	25
3	**Analysing :** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations **Evaluating:** Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. **Creating:** Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions	16	20
	Total	80	100

1. No chapter wise weightage. Care to be taken to cover all the chapters
2. Suitable internal variations may be made for generating various templates keeping the overall weightage to different form of questions and typology of questions same.

Choice(s):

There will be no overall choice in the question paper.

However, 33% internal choices will be given in all the sections

INTERNAL ASSESSMENT	**20 MARKS**
Periodic Tests (Best 2 out of 3 tests conducted)	10 Marks
Mathematics Activities	10 Marks

Note: For activities NCERT Lab Manual may be referred.

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

$$\frac{dx}{dy} + px = q, \text{ where p and q are functions of y or constants.}$$

Unit-IV: Vectors and Three-Dimensional Geometry

1. Vectors **15 Periods**

Vectors and scalars, magnitude and direction of a vector. Direction cosines and direction ratios of a vector. 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. Definition, Geometrical Interpretation, properties and application of scalar (dot) product of vectors, vector (cross) product of vectors.

2. Three - dimensional Geometry **15 Periods**

Direction cosines and direction ratios of a line joining two points. Cartesian equation and vector equation of a line, skew lines, shortest distance between two lines. Angle between two lines.

Unit-V: Linear Programming

1. Linear Programming **20 Periods**

Introduction, related terminology such as constraints, objective function, optimization, graphical method of solution for problems in two variables, feasible and infeasible regions (bounded or unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

Unit-VI: Probability

1. Probability **30 Periods**

Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution, mean of random variable.

Determinant of a square matrix (up to 3 x 3 matrices), minors, co-factors 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

1. Continuity and Differentiability **20 Periods**

Continuity and differentiability, chain rule, derivative of inverse trigonometric functions, *like* $\sin^{-1} x, \cos^{-1} x$ and $\tan^{-1} x$, derivative of implicit functions. Concept of exponential and logarithmic functions.

Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives.

2. Applications of Derivatives **10 Periods**

Applications of derivatives: rate of change of quantities, increasing/decreasing functions, 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 **20 Periods**

Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, Evaluation of simple integrals of the following types and problems based on them.

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

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

$$\int \sqrt{ax^2 + bx + c}\, dx,$$

Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.

4. Applications of the Integrals **15 Periods**

Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only)

5. Differential Equations **15 Periods**

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

CLASS-XII

(2024-25)

One Paper **Max Marks: 80**

No.	Units	No. of Periods	Marks
I.	Relations and Functions	30	08
II.	Algebra	50	10
III.	Calculus	80	35
IV.	Vectors and Three - Dimensional Geometry	30	14
V.	Linear Programming	20	05
VI.	Probability	30	08
	Total	240	80
	Internal Assessment		20

Unit-I: Relations and Functions

1. Relations and Functions **15 Periods**

Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions.

2. Inverse Trigonometric Functions **15 Periods**

Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions.

Unit-II: Algebra

1. Matrices **25 Periods**

Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operations on matrices: Addition and multiplication and multiplication with a scalar. 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). Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

2. Determinants **25 Periods**

MATHEMATICS

QUESTION PAPER

DESIGN CLASS – XI

Time: 3 Hours **(2024-25)** **Max. Marks: 80**

S. No.	Typology of Questions	Total Marks	% Weightage
1	**Remembering:** Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. **Understanding:** Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	44	55
2	**Applying:** Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	20	25
3	**Analysing :** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations **Evaluating:** Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. **Creating:** Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions	16	20
	Total	80	100

1. No chapter wise weightage. Care to be taken to cover all the chapters
2. Suitable internal variations may be made for generating various templates keeping the overall weightage to different form of questions and typology of questions same.

Choice(s):

There will be no overall choice in the question paper.

However, 33% internal choices will be given in all the sections

INTERNAL ASSESSMENT	**20 MARKS**
Periodic Tests (Best 2 out of 3 tests conducted)	10 Marks
Mathematics Activities	10 Marks

Note: Please refer the guidelines given under XII Mathematics Syllabus:

Unit-III: Coordinate Geometry

1. Straight Lines (15) Periods

Brief recall of two dimensional geometry from earlier classes. Slope of a line and angle between two lines. Various forms of equations of a line: parallel to axis, point -slope form, slope-intercept form, two-point form, intercept form, Distance of a point from a line.

2. Conic Sections (25) Periods

Sections of a cone: circles, ellipse, parabola, hyperbola, a point, a straight line and a 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 (10) Periods

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

Unit-IV: Calculus

1. Limits and Derivatives (40) Periods

Derivative introduced as rate of change both as that of distance function and geometrically. Intuitive idea of limit. Limits of polynomials and rational functions trigonometric, exponential and logarithmic functions. Definition of derivative relate it to scope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.

Unit-V Statistics and Probability

1. Statistics (20) Periods

Measures of Dispersion: Range, Mean deviation, variance and standard deviation of ungrouped/grouped data.

2. Probability (20) Periods

Events; occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events, Axiomatic (set theoretic) probability, connections with other theories of earlier classes. Probability of an event, probability of 'not', 'and' and 'or' events.

the identity sin2x + cos2x = 1, for all x. Signs of trigonometric functions. Domain and range of trigonometric functions and their graphs. Expressing sin (x±y) and cos (x±y) in terms of sinx, siny, cosx & cosy and their simple applications. Deducing identities like the following:

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

$$\sin\alpha \pm \sin\beta = 2\sin\frac{1}{2}(\alpha \pm \beta)\cos\frac{1}{2}(\alpha \mp \beta)$$

$$\cos\alpha + \cos\beta = 2\cos\frac{1}{2}(\alpha + \beta)\cos\frac{1}{2}(\alpha - \beta)$$

$$cos\alpha - cos\beta = -2sin\frac{1}{2}(\alpha + \beta)sin\frac{1}{2}(\alpha - \beta)$$

Identities related to sin2x, cos2x, tan2 x, sin3x, cos3x and tan3x.

Unit-II: Algebra

1. **Complex Numbers and Quadratic Equations** **(10) Periods**

Need for complex numbers, especially $\sqrt{-1}$, to be motivated by inability to solve some of the quadratic equations. Algebraic properties of complex numbers. Argand plane

2. **Linear Inequalities** **(10) Periods**

Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line.

3. **Permutations and Combinations** **(10) Periods**

Fundamental principle of counting. Factorial n. (n!) Permutations and combinations, derivation of Formulae for ${}^{n}P_{r}$ and ${}^{n}C_{r}$ and their connections, simple applications.

4. **Binomial Theorem** **(10) Periods**

Historical perspective, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, simple applications.

5. **Sequence and Series** **(10) Periods**

Sequence and Series. Arithmetic Mean (A.M.) Geometric Progression (G.P.), general term of a G.P., sum of n terms of a G.P., infinite G.P. and its sum, geometric mean (G.M.), relation between A.M. and G.M.

COURSE

STRUCTURE CLASS

XI (2024-25)

One Paper Total Period–240 [35 Minutes each]

Three Hours **Max Marks: 80**

No.	Units	No. of Periods	Marks
I.	Sets and Functions	60	23
II.	Algebra	50	25
III.	Coordinate Geometry	50	12
IV.	Calculus	40	08
V.	Statistics and Probability	40	12
	Total	240	80
	Internal Assessment		20

*No chapter/unit-wise weightage. Care to be taken to cover all the chapters.

Unit-I: Sets and Functions

1. **Sets** **(20) Periods**

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

2. **Relations & Functions** **(20) Periods**

Ordered pairs. Cartesian product of sets. Number of elements in the Cartesian product of two finite sets. Cartesian product of the set of reals with itself (upto R x R x R).Definition of relation, pictorial diagrams, domain, co-domain and range of a relation. Function as a special type of relation. Pictorial representation of a function, domain, co-domain and range of a function. Real valued functions, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum, exponential, logarithmic 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 and in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of

MATHEMATICS (XI-XII)

(Code No. 041)

Session – 2024-25

The Syllabus in the subject of Mathematics has undergone changes from time to time in accordance with growth of the subject and emerging needs of the society. Senior Secondary stage is a launching stage from where the students go either for higher academic education in Mathematics or for professional courses like Engineering, Physical and Biological science, Commerce or Computer Applications. The present revised syllabus has been designed in accordance with National Curriculum Framework 2005 and as per guidelines given in Focus Group on Teaching of Mathematics 2005 which is to meet the emerging needs of all categories of students. Motivating the topics from real life situations and other subject areas, greater emphasis has been laid on application of various concepts.

Objectives

The broad objectives of teaching Mathematics at senior school stage intend to help the students:

- to 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.
- to feel the flow of reasons while proving a result or solving a problem.
- to apply the knowledge and skills acquired to solve problems and wherever possible, by more than one method.
- to develop positive attitude to think, analyze and articulate logically.
- to develop interest in the subject by participating in related competitions.
- to acquaint students with different aspects of Mathematics used in daily life.
- to develop an interest in students to study Mathematics as a discipline.
- to develop awareness of the need for national integration, protection of environment, observance of small family norms, removal of social barriers, elimination of gender biases.
- to develop reverence and respect towards great Mathematicians for their contributions to the field of Mathematics.

PHYSICS

Class XI-XII (Code No.42)

(2024-25)

Senior Secondary stage of school education is a stage of transition from general education to discipline-based focus on curriculum. The present updated syllabus keeps in view the rigor and depth of disciplinary approach as well as the comprehension level of learners. Due care has also been taken that the syllabus is comparable to the international standards. Salient features of the syllabus include:

- Emphasis on basic conceptual understanding of the content.
- Emphasis on use of SI units, symbols, nomenclature of physical quantities and formulations as per international standards.
- Providing logical sequencing of units of the subject matter and proper placement of concepts with their linkage for better learning.
- Reducing the curriculum load by eliminating overlapping of concepts/content within the discipline and other disciplines.
- Promotion of process-skills, problem-solving abilities and applications of Physics concepts.

Besides, the syllabus also attempts to

Strengthen the concepts developed at the secondary stage to provide firm foundation for further learning in the subject.

: Expose the learners to different processes used in Physics-related industrial and technological applications.

Develop process-skills and experimental, observational, manipulative, decision making and investigatory skills in the learners.

- Promote problem solving abilities and creative thinking in learners.

: Develop conceptual competence in the learners and make them realize and appreciate the interface of Physics with other disciplines.

PHYSICS (Code No. 042)
COURSE STRUCTURE
Class XI - 2024-25 (Theory)

Time: 3 hrs. **Max Marks: 70**

		No. of Periods	Marks
Unit–I	**Physical World and Measurement**	**08**	**23**
	Chapter–2: Units and Measurements		
Unit-II	**Kinematics**	**24**	
	Chapter–3: Motion in a Straight Line		
	Chapter–4: Motion in a Plane		
Unit–III	**Laws of Motion**	**14**	
	Chapter–5: Laws of Motion		
Unit–IV	**Work, Energy and Power**	**14**	**17**
	Chapter–6: Work, Energy and Power		
Unit–V	**Motion of System of Particles and Rigid Body**	**18**	
	Chapter–7: System of Particles and Rotational Motion		
Unit-VI	**Gravitation**	**12**	
	Chapter–8: Gravitation		
Unit–VII	**Properties of Bulk Matter**	**24**	**20**
	Chapter–9: Mechanical Properties of Solids		
	Chapter–10: Mechanical Properties of Fluids		
	Chapter–11: Thermal Properties of Matter		
Unit–VIII	**Thermodynamics**	**12**	
	Chapter–12: Thermodynamics		
Unit–IX	**Behaviour of Perfect Gases and Kinetic Theory of Gases**	**08**	
	Chapter–13: Kinetic Theory		
Unit–X	**Oscillations and Waves**	**26**	**10**
	Chapter–14: Oscillations		
	Chapter–15: Waves		
Total		**160**	**70**

Unit I: Physical World and Measurement **08 Periods**

Chapter–2: Units and Measurements

Need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units. significant figures. Dimensions of physical quantities, dimensional analysis and its applications.

Unit II: Kinematics **24 Periods**

Chapter–3: Motion in a Straight Line

Frame of reference, Motion in a straight line, Elementary concepts of differentiation and integration for describing motion, uniform and non-uniform motion, and instantaneous velocity, uniformly accelerated motion, velocity - time and position-time graphs. Relations for uniformly accelerated motion (graphical treatment).

Chapter–4: Motion in a Plane

Scalar and vector quantities; position and displacement vectors, general vectors and their notations; equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors, Unit vector; resolution of a vector in a plane, rectangular components, Scalar and Vector product of vectors.

Motion in a plane, cases of uniform velocity and uniform acceleration-projectile motion, uniform circular motion.

Unit III: Laws of Motion **14 Periods**

Chapter–5: Laws of Motion

Intuitive concept of force, Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion.

Law of conservation of linear momentum and its applications.

Equilibrium of concurrent forces, Static and kinetic friction, laws of friction, rolling friction, lubrication.

Dynamics of uniform circular motion: Centripetal force, examples of circular motion (vehicle on a level circular road, vehicle on a banked road).

Unit IV: Work, Energy and Power 14 Periods

Chapter–6: Work, Energy and Power

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: non-conservative forces, motion in a vertical circle; elastic and inelastic collisions in one and two dimensions.

Unit V: Motion of System of Particles and Rigid Body 18 Periods

Chapter–7: System of Particles and Rotational Motion

Centre of mass of a two-particle system, momentum conservation and Centre of mass motion. Centre of mass of a rigid body; centre of mass of a uniform rod.

Moment of a force, torque, angular momentum, law of conservation of angular momentum and its applications.

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).

Unit VI: Gravitation 12 Periods

Chapter–8: Gravitation

Kepler's laws of planetary motion, universal law of gravitation.
Acceleration due to gravity and its variation with altitude and depth.

Gravitational potential energy and gravitational potential, escape speed,

orbital velocity of a satellite.

Unit VII: Properties of Bulk Matter **24 Periods**

Chapter–9: Mechanical Properties of Solids

Elasticity, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear modulus of rigidity (qualitative idea only), Poisson's ratio; elastic energy.

Chapter–10: Mechanical Properties of Fluids

Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes), effect of gravity on fluid pressure.

Viscosity, Stokes' law, terminal velocity, streamline and turbulent flow, critical velocity, Bernoulli's theorem and its simple applications.

Surface energy and surface tension, angle of contact, excess of pressure across a curved surface, application of surface tension ideas to drops, bubbles and capillary rise.

Chapter–11: Thermal Properties of Matter

Heat, temperature, thermal expansion; thermal expansion of solids, liquids and gases, anomalous expansion of water; specific heat capacity; Cp, Cv - calorimetry; change of state - latent heat capacity.

Heat transfer-conduction, convection and radiation, thermal conductivity, qualitative ideas of Blackbody radiation, Wein's displacement Law, Stefan's law .

Unit VIII: Thermodynamics **12 Periods**

Chapter–12: Thermodynamics

Thermal equilibrium and definition of temperature, zeroth law of thermodynamics, heat, work and internal energy. First law of thermodynamics,

Second law of thermodynamics: gaseous state of matter, change of condition

of gaseous state -isothermal, adiabatic, reversible, irreversible, and cyclic processes.

Unit IX: Behavior of Perfect Gases and Kinetic Theory of Gases 08 Periods

Chapter–13: Kinetic Theory

Equation of state of a perfect gas, work done in compressing a gas.

Kinetic theory of gases - assumptions, concept of pressure. Kinetic interpretation of temperature; rms speed of gas molecules; degrees of freedom, law of equi-partition of energy (statement only) and application to specific heat capacities of gases; concept of mean free path, Avogadro's number.

Unit X: Oscillations and Waves 26 Periods

Chapter–14: Oscillations

Periodic motion - time period, frequency, displacement as a function of time, periodic functions and their applications.

Simple harmonic motion (S.H.M) and its equations of motion; phase; oscillations of a loaded spring- restoring force and force constant; energy in S.H.M. Kinetic and potential energies; simple pendulum derivation of expression for its time period.

Chapter–15: Waves

Wave motion: Transverse and longitudinal waves, speed of travelling wave, 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.

PRACTICALS

Total Periods: 60

The record, to be submitted by the students, at the time of their annual examination, has to include:

- Record of at least 8 Experiments [with 4 from each section], to be performed by the students.
- Record of at least 6 Activities [with 3 each from section A and section B], to be performed by the students.
- Report of the project carried out by the students.

EVALUATION SCHEME

Time 3 hours **Max. Marks: 30**

Topic	Marks
Two experiments one from each section	7+7
Practical record (experiment and activities)	5
One activity from any section	3
Investigatory Project	3
Viva on experiments, activities and project	5
Total	**30**

SECTION–A

Experiments

1. To measure diameter of a small spherical/cylindrical body and to measure internal diameter and depth of a given beaker/calorimeter using Vernier Callipers and hence find its volume.
2. To measure diameter of a given wire and thickness of a given sheet using screw gauge.

3. To determine volume of an irregular lamina using screw gauge.
4. To determine radius of curvature of a given spherical surface by a spherometer.
5. To determine the mass of two different objects using a beam balance.
6. To find the weight of a given body using parallelogram law of vectors.
7. Using a simple pendulum, plot its L-T^2 graph and use it to find the effective length of second's pendulum.
8. To study variation of time period of a simple pendulum of a given length by taking bobs of same size but different masses and interpret the result.
9. To study the relationship between force of limiting friction and normal reaction and to find the co- efficient of friction between a block and a horizontal surface.
10. 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 θ by plotting graph between force and Sinθ.

Activities

1. To make a paper scale of given least count, e.g., 0.2cm, 0.5 cm.
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 projectile with angle of projection.
6. To study the conservation of energy of a ball rolling down on an 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 a 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 1/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. To determine specific heat capacity of a given solid by method of mixtures.
8. To study the relation between frequency and length of a given wire under constant tension using sonometer.
9. To study the relation between the length of a given wire and tension for constant frequency using sonometer.
10. To find the speed of sound in air at room temperature using a resonance tube by two resonance positions.

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 of water 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 at (i) its end (ii) in the middle.
7. To observe the decrease in pressure with increase in velocity of a fluid.

Practical Examination for Visually Impaired

Students Class XI

Note: Same Evaluation scheme and general guidelines for visually impaired students as given for Class XII may be followed.

A. Items for Identification/Familiarity of the apparatus for assessment in practical's (All experiments)

Spherical ball, Cylindrical objects, vernier calipers, beaker, calorimeter, Screw gauge, wire, Beam balance, spring balance, weight box, gram and milligram weights, forceps, Parallelogram law of vectors apparatus, pulleys and pans used in the same 'weights' used, Bob and string used in a simple pendulum, meter scale, split cork, suspension arrangement, stop clock/stop watch, Helical spring, suspension arrangement used, weights, arrangement used for measuring extension, Sonometer, Wedges, pan and pulley used in it, 'weights' Tuning Fork, Meter scale, Beam balance, Weight box, gram and milligram weights, forceps, Resonance Tube, Tuning Fork, Meter scale, Flask/Beaker used for adding water.

B. List of Practicals

1. To measure diameter of a small spherical/cylindrical body using vernier calipers.
2. To measure the internal diameter and depth of a given beaker/calorimeter using vernier calipers and hence find its volume.
3. To measure diameter of given wire using screw gauge.
4. To measure thickness of a given sheet using screw gauge.
5. To determine the mass of a given object using a beam balance.
6. To find the weight of given body using the parallelogram law of vectors.
7. Using a simple pendulum plot L-T and L-T^2 graphs. Hence find the effective length of second's pendulum using appropriate length values.
8. To find the force constant of given helical spring by plotting a graph between load and extension.
9. (i) To study the relation between frequency and length of a given wire under constant tension using a sonometer.

(ii) To study the relation between the length of a given wire and tension, for constant frequency, using a sonometer.

10. To find the speed of sound in air, at room temperature, using a resonance tube, by observing the two resonance positions.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Physics Part-I, Textbook for Class XI, Published by NCERT
2. Physics Part-II, Textbook for Class XI, Published by NCERT
3. Laboratory Manual of Physics, Class XI Published by NCERT
4. The list of other related books and manuals brought out by NCERT (consider multimedia also).

Note:
The content indicated in NCERT textbooks as excluded for the year 2023-24 is not to be tested by schools.

CLASS XII (2024-25)

PHYSICS (THEORY)

Time: 3 hrs. **Max Marks: 70**

		No. of Periods	Marks
Unit–I	**Electrostatics**	**26**	**16**
	Chapter–1: Electric Charges and Fields		
	Chapter–2: Electrostatic Potential and Capacitance		
Unit-II	**Current Electricity**	**18**	
	Chapter–3: Current Electricity		
Unit-III	**Magnetic Effects of Current and Magnetism**	**25**	**17**
	Chapter–4: Moving Charges and Magnetism		
	Chapter–5: Magnetism and Matter		
Unit-IV	**Electromagnetic Induction and Alternating Currents**	**24**	
	Chapter–6: Electromagnetic Induction		
	Chapter–7: Alternating Current		
Unit–V	**Electromagnetic Waves**	**04**	**18**
	Chapter–8: Electromagnetic Waves		
Unit–VI	**Optics**	**30**	
	Chapter–9: Ray Optics and Optical Instruments		
	Chapter–10: Wave Optics		
Unit–VII	**Dual Nature of Radiation and Matter**	**8**	**12**
	Chapter–11: Dual Nature of Radiation and Matter		
Unit–VIII	**Atoms and Nuclei**	**15**	
	Chapter–12: Atoms		
	Chapter–13: Nuclei		
Unit–IX	**Electronic Devices**	**10**	**7**
	Chapter–14: Semiconductor Electronics: Materials, Devices and Simple Circuits		
Total		**160**	**70**

Unit I: Electrostatics — 26 Periods

Chapter–1: Electric Charges and Fields

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 due to infinitely long straight wire, uniformly charged infinite plane sheet and uniformly charged thin spherical shell (field inside and outside).

Chapter–2: Electrostatic Potential and Capacitance

Electric potential, potential difference, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electrical potential energy of a system of two-point charges and of electric dipole in an 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 (no derivation, formulae only).

Unit II: Current Electricity — 18 Periods

Chapter–3: Current Electricity

Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity, 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 rules, Wheatstone bridge.

Unit III: Magnetic Effects of Current and Magnetism 25 Periods

Chapter–4: Moving Charges and Magnetism

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 solenoid (only qualitative treatment), force on a moving charge in uniform magnetic and electric fields.

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; Current loop as a magnetic dipole and its magnetic dipole moment, moving coil galvanometer- its current sensitivity and conversion to ammeter and voltmeter.

Chapter–5: Magnetism and Matter

Bar magnet, bar magnet as an equivalent solenoid (qualitative treatment only), magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis (qualitative treatment only), torque on a magnetic dipole (bar magnet) in a uniform magnetic field (qualitative treatment only), magnetic field lines.

Magnetic properties of materials- Para-, dia- and ferro -
magnetic substances with examples, Magnetization of materials,
effect of temperature on magnetic properties.

Unit IV: Electromagnetic Induction and Alternating Currents 24 Periods

Chapter–6: Electromagnetic Induction

Electromagnetic induction; Faraday's laws, induced EMF and current;
Lenz's Law, Self and mutual induction.

Chapter–7: Alternating Current

Alternating currents, peak and RMS value of alternating current/voltage; reactance and impedance; LCR series circuit (phasors only), resonance, power in AC circuits, power factor, wattless current.

AC generator, Transformer.

Unit V: Electromagnetic waves 04 Periods

Chapter–8: Electromagnetic Waves

Basic idea of displacement current, Electromagnetic waves, their characteristics, their transverse nature (qualitative idea only).

Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, X-rays, gamma rays) including elementary facts about their uses.

Unit VI: Optics 30 Periods

Chapter–9: Ray Optics and Optical Instruments

Ray Optics: Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and optical fibers, refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula, magnification, power of a lens, combination of thin lenses in contact, refraction of light through a prism.

Optical instruments: Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.

Chapter–10: Wave Optics

Wave optics: Wave front and Huygen's principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygen's principle. Interference, Young's double slit experiment and expression for fringe width (No derivation final expression only), coherent sources and sustained interference of light, diffraction due to a single slit, width of central maxima (qualitative treatment only).

Unit VII: Dual Nature of Radiation and Matter **08 Periods**

Chapter–11: Dual Nature of Radiation and Matter

Dual nature of radiation, Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation-particle nature of light.

Experimental study of photoelectric effect

Matter waves-wave nature of particles, de-Broglie relation.

Unit VIII: Atoms and Nuclei **15 Periods**

Chapter–12: Atoms

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, Expression for radius of nth possible orbit, velocity and energy of electron in nth orbit, hydrogen line spectra (qualitative treatment only).

Chapter–13: Nuclei

Composition and size of nucleus, nuclear force

Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear fusion.

Unit IX: Electronic Devices **10 Periods**

Chapter–14: Semiconductor Electronics: Materials, Devices and Simple Circuits

Energy bands in conductors, semiconductors and insulators (qualitative ideas only) Intrinsic and extrinsic semiconductors- p and n type, p-n junction

Semiconductor diode - I-V characteristics in forward and reverse bias, application of junction diode -diode as a rectifier.

PRACTICALS

Total Periods 60

The record to be submitted by the students at the time of their annual examination has to include:

Record of at least 8 Experiments [with 4 from each section], to be performed by the students.

: Record of at least 6 Activities [with 3 each from section A and section B], to be performed by the students.

- The Report of the project carried out by the students.

Evaluation Scheme

Max. Marks: 30

Time 3 hours

Two experiments one from each section	7+7 Marks
Practical record [experiments and activities]	5 Marks
One activity from any section	3 Marks
Investigatory Project	3 Marks
Viva on experiments, activities and project	5 Marks
Total	**30 marks**

Experiments **SECTION–A**

1. To determine resistivity of two / three wires by plotting a graph for potential difference versus current.
2. To find resistance of a given wire / standard resistor using metre bridge.
3. To verify the laws of combination (series) of resistances using a metre bridge.

OR

To verify the laws of combination (parallel) of resistances using a metre bridge.

4. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.
5. To convert the given galvanometer (of known resistance and figure of merit) into a voltmeter of desired range and to verify the same.

OR

To convert the given galvanometer (of known resistance and figure of merit) into an ammeter of desired range and to verify the same.

6. To find the frequency of AC 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 mirror, using a convex lens.
3. To find the focal length of a convex lens by plotting graphs between *u* and *v* or between *1/u* and *1/v*.
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 travelling microscope.
7. To find the refractive index of a liquid using convex lens and plane mirror.
8. To find the refractive index of a liquid using a concave mirror and a plane mirror.
9. To draw the I-V characteristic curve for a p-n junction diode in forward and reverse bias.

Activities

1. To identify a diode, an LED, a resistor and a capacitor from a mixed collection of such items.
2. Use of multimeter to see the unidirectional flow of current in case of a diode and an LED and check whether a given electronic component (e.g., diode) is in working order.
3. To study effect of intensity of light (by varying distance of the source) on an LDR.
4. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
5. To observe diffraction of light due to a thin slit.
6. To study the nature and size of the image formed by a (i) convex lens, or (ii) concave mirror, on a screen by using a candle and a screen (for different distances of the candle from the lens/mirror).
7. To obtain a lens combination with the specified focal length by using two lenses from the given set of lenses.

Suggested Investigatory Projects

1. To study various factors on which the internal resistance/EMF of a cell depends.
2. To study the variations in current flowing in a circuit containing an LDR because of a variation in

   (a) the power of the incandescent lamp, used to 'illuminate' the LDR (keeping all the lamps at a fixed distance).

(b) the distance of a incandescent lamp (of fixed power) used to 'illuminate' the LDR.

3. To find the refractive indices of (a) water (b) oil (transparent) using a plane mirror, an equiconvex lens (made from a glass of known refractive index) and an adjustable object needle.

4. To investigate the relation between the ratio of (i) output and input voltage and (ii) number of turns in the secondary coil and primary coil of a self-designed transformer.

5. To investigate the dependence of the angle of deviation on the angle of incidence using a hollow prism filled one by one, with different transparent fluids.

6. To estimate the charge induced on each one of the two identical Styrofoam (or pith) balls suspended in a vertical plane by making use of Coulomb's law.

7. To study the factor on which the self-inductance of a coil depends by observing the effect of this coil, when put in series with a resistor/(bulb) in a circuit fed up by an A.C. source of adjustable frequency.

8. To study the earth's magnetic field using a compass needle -bar magnet by plotting magnetic field lines and tangent galvanometer.

Practical Examination for Visually Impaired Students of

Classes XI and XII Evaluation Scheme

Time 2 hours **Max. Marks: 30**

Identification/Familiarity with the apparatus	5 marks
Written test (based on given/prescribed practicals)	10 marks
Practical Record	5 marks
Viva	10 marks
Total	**30 marks**

General Guidelines

- The practical examination will be of two-hour duration.
- A separate list of ten experiments is included here.

  The written examination in practicals for these students will be conducted at the time of practical examination of all other students.

  The written test will be of 30 minutes duration.

  The question paper given to the students should be legibly typed. It should contain a total of 15 practical skill based very short answer type questions. A student would be required to answer any 10 questions.

  A writer may be allowed to such students as per CBSE examination rules.

  All questions included in the question papers should be related to the listed practicals. Every question should require about two minutes to be answered.
- These students are also required to maintain a practical file. A student is expected to record at least five of the listed experiments as per the specific instructions for each subject. These practicals should be duly checked and signed by the internal examiner.
- The format of writing any experiment in the practical file should include aim, apparatus required, simple theory, procedure, related practical skills, precautions etc.
- Questions may be generated jointly by the external/internal examiners and used for assessment.

  The viva questions may include questions based on basic theory/principle/concept, apparatus/ materials/chemicals required, procedure, precautions, sources of error etc.

Class XII

A. Items for Identification/ familiarity with the apparatus for assessment in practicals (All experiments)

Meter scale, general shape of the voltmeter/ammeter, battery/power supply, connecting wires, standard resistances, connecting wires, voltmeter/ammeter, meter bridge, screw gauge, jockey Galvanometer, Resistance Box, standard Resistance, connecting wires, Potentiometer, jockey, Galvanometer, Lechlanche cell, Daniell cell [simple distinction between the two vis-à-vis their outer (glass and copper) containers], rheostat connecting wires, Galvanometer, resistance box, Plug-in and tapping keys, connecting wires battery/power supply, Diode, Resistor (Wire-wound or carbon ones with two wires connected to two ends), capacitors (one or two types), Inductors, Simple electric/electronic bell, battery/power supply, Plug- in and tapping keys, Convex lens, concave lens, convex mirror, concave mirror, Core/hollow wooden cylinder, insulated wire, ferromagnetic rod, Transformer core, insulated wire.

B. List of Practicals

1. To determine the resistance per cm of a given wire by plotting a graph between voltage and current.
2. To verify the laws of combination (series/parallel combination) of resistances by Ohm's law.
3. To find the resistance of a given wire / standard resistor using a meter bridge.
4. To determine the resistance of a galvanometer by half deflection method.
5. To identify a resistor, capacitor, inductor and diode from a mixed collection of such items.
6. To observe the difference between
   (i) a convex lens and a concave lens
   (ii) a convex mirror and a concave mirror and to estimate the likely difference between the power of two given convex /concave lenses.
7. To design an inductor coil and to know the effect of
   (i) change in the number of turns

(ii) Introduction of ferromagnetic material as its core material on the inductance of the coil.

8. To design a (i) step up (ii) step down transformer on a given core and know the relation between its input and output voltages.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Physics, Class XI, Part -I and II, Published by NCERT.
2. Physics, Class XII, Part -I and II, Published by NCERT.
3. Laboratory Manual of Physics for class XII Published by NCERT.
4. The list of other related books and manuals brought out by NCERT (consider multimedia also).

Note:
The content indicated in NCERT textbooks as excluded for the year 2023-24 is not to be tested by schools and will not be assessed in the Board examinations 2023-24.

QUESTION PAPER DESIGN

Theory (Class: XI/XII)

Maximum Marks: 70 **Duration: 3 hrs.**

S No.	Typology of Questions	Total Marks	Approximate Percentage
1	**Remembering**: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. **Understanding**: Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	27	38 %
2	**Applying**: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	22	32%
3	**Analysing :** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations **Evaluating:** Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. **Creating**: Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	21	30%
	Total Marks	70	100
	Practical	30	
	Gross Total	100	

Note:

The above template is only a sample. Suitable internal variations may be made for generating similar templates keeping the overall weightage to different form of questions and typology of questions same.

For more details kindly refer to Sample Question Paper of class XII for the year 2023- 24 to be published by CBSE at its website.

CHEMISTRY (Code No. 043)

XI-XII (2024-25)

Rationale

Higher Secondary is the most crucial stage of school education because at this juncture specialized discipline based, content -oriented courses are introduced. Students reach this stage after 10 years of general education and opt for Chemistry with a purpose of pursuing their career in basic sciences or professional courses like medicine, engineering, technology and study courses in applied areas of science and technology at tertiary level. Therefore, there is a need to provide learners with sufficient conceptual background of Chemistry, which will make them competent to meet the challenges of academic and professional courses after the senior secondary stage.

The new and updated curriculum is based on disciplinary approach with rigour and depth taking care that the syllabus is not heavy and at the same time it is comparable to the international level. The knowledge related to the subject of Chemistry has undergone tremendous changes during the past one decade. Many new areas like synthetic materials, bio -molecules, natural resources, industrial chemistry are coming in a big way and deserve to be an integral part of chemistry syllabus at senior secondary stage. At international level, new formulations and nomenclature of elements and compounds, symbols and units of physical quantities floated by scientific bodies like IUPAC and CGPM are of immense importance and need to be incorporated in the updated syllabus. The revised syllabus takes care of all these aspects. Greater emphasis has been laid on use of new nomenclature, symbols and formulations, teaching of fundamental concepts, application of concepts in chemistry to industry/ technology, logical sequencing of units, removal of obsolete content and repetition, etc.

Objectives

The curriculum of Chemistry at Senior Secondary Stage aims to:

- promote understanding of basic facts and concepts in chemistry while retaining the excitement of chemistry.
- make students capable of studying chemistry in academic and professional courses (such as medicine, engineering, technology) at tertiary level.
- expose the students to various emerging new areas of chemistry and apprise them with their relevance in future studies and their application in various spheres of chemical sciences and technology.
- equip students to face various challenges related to health, nutrition, environment, population, weather, industries and agriculture.
- develop problem solving skills in students.
- expose the students to different processes used in industries and their technological applications.
- apprise students with interface of chemistry with other disciplines of science such as physics, biology, geology, engineering etc.
- acquaint students with different aspects of chemistry used in daily life.
- develop an interest in students to study chemistry as a discipline.
- integrate life skills and values in the context of chemistry.

COURSE STRUCTURE
CLASS-XI (THEORY) (2024-25)

Time: 3 Hours **Total Marks70**

S.No	UNIT	No. of Periods	Marks
1	Some Basic Concepts of Chemistry	12	7
2	Structure of Atom	14	9
3	Classification of Elements and Periodicity in Properties	8	6
4	Chemical Bonding and Molecular Structure	14	7
5	Chemical Thermodynamics	16	9
6	Equilibrium	14	7
7	Redox Reactions	6	4
8	Organic Chemistry: Some basic Principles and Techniques	14	11
9	Hydrocarbons	12	10
	TOTAL		**70**

Unit I: Some Basic Concepts of Chemistry **12 Periods**

General Introduction: Importance and scope of Chemistry.

Nature of matter, laws of chemical combination, Dalton's atomic theory: concept of elements, atoms and molecules.

Atomic and molecular masses, mole concept and molar mass, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry.

Unit II: Structure of Atom **14 Periods**

Discovery of Electron, Proton and Neutron, atomic number, 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 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 **08 Periods**

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, inert gas radii, Ionization enthalpy, electron gain enthalpy, electronegativity, valency. Nomenclature of elements with atomic number greater than 100.

Unit IV: Chemical Bonding and Molecular Structure **14 Periods**

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 homonuclear diatomic molecules(qualitative idea only), Hydrogen bond.

Unit VI: Chemical Thermodynamics **16 Periods**

Concepts of System and 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, atomization, sublimation, phase transition, ionization, solution and dilution. Second law of Thermodynamics (brief introduction)

Introduction of entropy as a state function, Gibb's energy change for spontaneous and non-spontaneous processes, criteria for equilibrium.

Third law of thermodynamics (brief introduction).

Unit VII: Equilibrium **14 Periods**

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, ionization of poly basic acids, acid strength, concept of pH, hydrolysis of salts (elementary idea), buffer solution, Henderson Equation, solubility product, common ion effect (with illustrative examples).

Unit VIII: Redox Reactions **06 Periods**

Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, in terms of loss and gain of electrons and change in oxidation number, applications of redox reactions.

Unit XII: Organic Chemistry -Some Basic Principles and Techniques **14 Periods**

General introduction, methods of purification, qualitative and quantitative analysis, 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 **12 Periods**

Classification of Hydrocarbons

Aliphatic Hydrocarbons:

Alkanes - Nomenclature, isomerism, conformation (ethane only), physical properties, chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis.

Alkenes - Nomenclature, structure of double bond (ethene), 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 monosubstituted benzene. Carcinogenicity and toxicity.

PRACTICALS

Evaluation Scheme for Examination	Marks
Volumetric Analysis	08
Salt Analysis	08
Content Based Experiment	06
Project Work	04
Class record and viva	04
Total	**30**

PRACTICAL SYLLABUS **Total Periods: 60**

Micro-chemical methods are available for several of the practical experiments, wherever possible such techniques should be used.

A. Basic Laboratory Techniques

1. Cutting glass tube and glass rod
2. Bending a glass tube
3. Drawing out a glass jet
4. Boring a cork

B. Characterization 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 any one of the following: Alum, Copper Sulphate, Benzoic Acid.

C. Experiments based on pH

a) Any one of the following experiments:

- Determination of pH of some solutions obtained from fruit juices, solution of known and varied concentrations of acids, bases and salts using pH paper or universal indicator.
- Comparing the pH of solutions of strong and weak acids of same concentration. Study the pH change in the titration of a strong base using universal indicator.

b) Study the pH change by common-ion in case of weak acids and weak bases.

D. 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 of the 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.

E. Quantitative Estimation

i. Using a mechanical balance/electronic balance. ii.
Preparation of standard solution of Oxalic acid.

iii. Determination of strength of a given solution of Sodium hydroxide by titrating it against standard solution of Oxalic acid.

iv. Preparation of standard solution of Sodium carbonate.

v. Determination of strength of a given solution of hydrochloric acid by titrating it against standard Sodium Carbonate solution.

F. Qualitative Analysis

a) Determination of one anion and one cation in a given salt

Cations- Pb^{2+}, Cu^{2+}, As^{3+}, Al^{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-}, NO_2^- , SO_3^{2-}, SO_4^{2-}, NO_3^- , Cl- , Br-, I-, PO_4^{3-} , , CH_3COO^-(Note: Insoluble salts excluded)

b) Detection of -Nitrogen, Sulphur, Chlorine in organic compounds.

c) PROJECTS

Scientific investigations involving laboratory testing and collecting information from other sources.

A few suggested Projects

- Checking the bacterial contamination in drinking water by testing sulphide ion
- Study of the methods of purification of water

- Testing the hardness, presence of Iron, Fluoride, Chloride, etc., depending upon the regional variation in drinking water and study of causes of presence of these ions above permissible limit (if any).
- Investigation of the foaming capacity of different washing soaps and the effect of addition of Sodium carbonate on it
- Study the acidity of different samples of tea leaves.
- Determination of the rate of evaporation of different liquids Study the effect of acids and bases on the tensile strength of fibers.
- Study of acidity of fruit and vegetable juices.

Note: Any other investigatory project, which involves about 10 periods of work, can be chosen with the approval of the teacher.

Practical Examination for Visually Impaired Students
Class XI

Note: Same Evaluation scheme and general guidelines for visually impaired students as given for Class XII may be followed.

A. List of apparatus for identification for assessment in practicals (All experiments)

Beaker, tripod stand, wire gauze, glass rod, funnel, filter paper, Bunsen burner, test tube, test tube stand, dropper, test tube holder, ignition tube, china dish, tongs, standard flask, pipette, burette, conical flask, clamp stand, dropper, wash bottle

- Odour detection in qualitative analysis
- Procedure/Setup of the apparatus

B. List of Experiments A. Characterization and Purification of Chemical Substances

1. Crystallization of an impure sample of any one of the following: copper sulphate, benzoic acid

B. Experiments based on pH

1. Determination of pH of some solutions obtained from fruit juices, solutions of known and varied concentrations of acids, bases and salts using pH paper
2. Comparing the pH of solutions of strong and weak acids of same concentration.

C. Chemical Equilibrium

1. Study the shift in equilibrium between ferric ions and thiocyanate ions by increasing/decreasing the concentration of eitherions.
2. Study the shift in equilibrium between $[Co(H_2O)_6]^{2+}$ and chloride ions by changing the concentration of either of the ions.

D. Quantitative estimation

1. Preparation of standard solution of oxalic acid.
2. Determination of molarity of a given solution of sodium hydroxide by titrating it against standard solution of oxalic acid.

E. Qualitative Analysis

1. Determination of one anion and one cation in a given salt
2. Cations - NH^+_4
   Anions – $(CO_3)^{2-}$, S^{2-}, $(SO_3)^{2-}$, Cl^-, CH_3COO^-
   (Note: insoluble salts excluded)

3. Detection of Nitrogen in the given organic compound.
4. Detection of Halogen in the given organic compound.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Chemistry Part – I, Class-XI, Published by NCERT.
2. Chemistry Part – II, Class-XI, Published by NCERT.

Time : 3 Hours **CLASS XII (2024-25) (THEORY)** **70 Marks**

S.No.	Title	No. of Periods	Marks
1	Solutions	10	7
2	Electrochemistry	12	9
3	Chemical Kinetics	10	7
4	d -and f -Block Elements	12	7
5	Coordination Compounds	12	7
6	Haloalkanes and Haloarenes	10	6
7	Alcohols, Phenols and Ethers	10	6
8	Aldehydes, Ketones and Carboxylic Acids	10	8
9	Amines	10	6
10	Biomolecules	12	7
	Total		**70**

Unit II: Solutions **10 Periods**

Types of solutions, expression of concentration of solutions of solids in liquids, solubility of gases in liquids, solid solutions, Raoult's law, colligative properties - relative lowering of vapour pressure, elevation of boiling point, depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, Van't Hoff factor.

Unit III: Electrochemistry **12 Periods**

Redox reactions, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells, Relation between Gibbs energy change and EMF of a cell, conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Kohlrausch's Law, electrolysis and law of electrolysis (elementary idea), dry cell-electrolytic cells and Galvanic cells, lead accumulator, fuel cells, corrosion.

Unit IV: Chemical Kinetics **10 Periods**

Rate of a reaction (Average and instantaneous), factors affecting rate 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), activation energy, Arrhenius equation.

Unit VIII: d and f Block Elements **12 Periods**

General introduction, electronic configuration, occurrence and characteristics 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 and its consequences.

Actinoids - Electronic configuration, oxidation states and comparison with lanthanoids.

Unit IX: Coordination Compounds **12 Periods**

Coordination compounds - Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding, Werner's theory, VBT, and CFT; structure and stereoisomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological system).

Unit X: Haloalkanes and Haloarenes. **10 Periods**

Haloalkanes: Nomenclature, nature of C–X bond, physical and chemical properties, optical rotation mechanism of substitution reactions.

Haloarenes: Nature of C–X bond, substitution reactions (Directive influence of halogen in monosubstituted compounds only).

Uses and environmental effects of - dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT.

Unit XI: Alcohols, Phenols and Ethers **10 Periods**

Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only), identification of primary, secondary and tertiary alcohols, mechanism of dehydration, uses with special reference to methanol and ethanol.

Phenols: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophillic substitution reactions, uses of phenols.

Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses.

Unit XII: Aldehydes, Ketones and Carboxylic Acids **10 Periods**

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, uses.

Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

Unit XIII: Amines **10 Periods**

Amines: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines.

Diazonium salts: Preparation, chemical reactions and importance in synthetic organic chemistry.

Unit XIV: Biomolecules **12 Periods**

Carbohydrates - Classification (aldoses and ketoses), monosaccahrides (glucose and fructose), D-L configuration oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); Importance of carbohydrates.

Proteins -Elementary idea of - amino acids, peptide bond, polypeptides, proteins, structure of proteins - primary, secondary, tertiary structure and quaternary structures (qualitative idea only), denaturation of proteins; enzymes. Hormones - Elementary idea excluding structure.

Vitamins - Classification and functions.
Nucleic Acids: DNA and RNA.

PRACTICALS

Evaluation Scheme for Examination	Marks
Volumetric Analysis	08
Salt Analysis	08
Content Based Experiment	06
Project Work	04
Class record and viva	04
Total	**30**

PRACTICAL SYLLABUS **60Periods**

Micro-chemical methods are available for several of the practical experiments. Wherever possible, such techniques should be used.

A. Surface Chemistry

(a) Preparation of one lyophilic and one lyophobic sol

Lyophilic sol - starch, egg albumin and gum

Lyophobic sol - aluminium hydroxide, ferric hydroxide, arsenous sulphide.

(b) Dialysis of sol-prepared in (a) above.

(c) Study of the role of emulsifying agents in stabilizing the emulsion of different oils.

B. 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).

C. Thermochemistry

Any one of the following experiments

i) Enthalpy of dissolution of Copper Sulphate or Potassium Nitrate.

ii) Enthalpy of neutralization of strong acid (HCl) and strong base (NaOH).

iii) Determination of enthaply change during interaction (Hydrogen bond formation) between Acetone and Chloroform.

D. Electrochemistry

Variation of cell potential in $Zn/Zn^{2+}||\ Cu^{2+}/Cu$ with change in concentration of electrolytes ($CuSO_4$ or $ZnSO_4$) at room temperature.

E. Chromatography

i) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of Rf values.

ii) Separation of constituents present in an inorganic mixture containing two cations only (constituents having large difference in Rf values to be provided).

F. Preparation of Inorganic Compounds

Preparation of double salt of Ferrous Ammonium Sulphate or Potash Alum. Preparation of Potassium Ferric Oxalate.

G. Preparation of Organic Compounds

Preparation of any one of the following compounds

i) Acetanilide ii) Di -benzalAcetone iii) p-Nitroacetanilide iv) Aniline yellow or 2 - Naphthol Anilinedye.

H. Tests for the functional groups present in organic compounds:

Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (Primary) groups.

I. **Characteristic tests of carbohydrates, fats and proteins in pure samples and their detection in given foodstuffs.**

J. **Determination of concentration/ molarity of $KMnO_4$ solution by titrating it against a standard solution of:**

i) Oxalic acid,

ii) Ferrous Ammonium Sulphate

(Students will be required to prepare standard solutions by weighing themselves). **K.**

Qualitative analysis

Determination of one cation and one anion in a given salt.

Cation : Pb^{2+}, Cu^{2+} As^{3+}, $A\ell^{3+}$, Fe^{3+}, Mn^{2+}, Zn^{2+}, Cu^{2+}, Ni^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mg^{2+}, NH_4^+

Anions: $(CO_3)^{2-}$, S^{2-}, $(SO_3)^{2-}$, $(NO_2)^-$, $(SO_4)^{2-}$, $C\ell^-$, Br^-, I^-, PO^{3-}_4, $(C_2O_4)^{2-}$, CH_3COO^-,NO_3^-

(Note: Insoluble salts excluded)

PROJECT

Scientific investigations involving laboratory testing and collecting information from other sources A few suggested Projects.

- Study of the presence of oxalate ions in guava fruit at different stages of ripening.
- Study of quantity of casein present in different samples of milk.
- Preparation of soybean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, etc.
- Study of the effect of Potassium Bisulphate as food preservative under various conditions (temperature, concentration, time, etc.)
- Study of digestion of starch by salivary amylase and effect of pH and temperature on it.
- Comparative study of the rate of fermentation of following materials: wheat flour, gram flour, potato juice, carrot juice, etc.
- Extraction of essential oils present in Saunf (aniseed), Ajwain (carum), Illaichi (cardamom).
- Study of common food adulterants in fat, oil, butter, sugar, turmeric power, chilli powder and pepper.

Note: Any other investigatory project, which involves about 10 periods of work, can be chosen with the approval of the teacher.

Practical Examination for Visually Impaired Students of Classes XI and XII Evaluation Scheme

Time Allowed: Two hours **Max. Marks: 30**

Identification/Familiarity with the apparatus	5 marks
Written test (based on given/prescribed practicals)	10 marks
Practical Record	5 marks
Viva	10 marks
Total	**30 marks**

General Guidelines

- The practical examination will be of two hour duration.
- A separate list of ten experiments is included here.
- The written examination in practicals for these students will be conducted at the time of practical examination of all other students.
- The written test will be of 30 minutes duration.
- The question paper given to the students should be legibly typed. It should contain a total of 15 practical skill based very short answer type questions. A student would be required to answer any 10 questions.
- A writer may be allowed to such students as per CBSE examination rules.
- All questions included in the question papers should be related to the listed practicals. Every question should require about two minutes to be answered.
- These students are also required to maintain a practical file. A student is expected to record at least five of the listed experiments as per the specific instructions for each subject. These practicals should be duly checked and signed by the internal examiner.
- The format of writing any experiment in the practical file should include aim, apparatus required, simple theory, procedure, related practical skills, precautions etc.
- Questions may be generated jointly by the external/internal examiners and used for assessment.
- The viva questions may include questions based on basic theory/principle/concept, apparatus/materials/ chemicals required, procedure, precautions, sources of error etc.

A. Items for Identification/Familiarity of the apparatus for assessment in practical (All experiments)

Beaker, glass rod, tripod stand, wire gauze, Bunsen burner, Whatman filter paper, gas jar, capillary tube, pestle and mortar, test tubes, tongs, test tube holder, test tube stand, burette, pipette, conical flask, standard flask, clamp stand, funnel, filter paper

Hands-on Assessment

- Identification/familiarity with the apparatus
- Odour detection in qualitative analysis

B. List of Practicals

The experiments have been divided into two sections: Section A and Section B. The experiments mentioned in Section B are mandatory.

SECTION- A

A Surface Chemistry

(1) Preparation of one lyophilic and one lyophobic sol Lyophilic sol - starch, egg albumin and gum

(2) Preparation of one lyophobic sol Lyophobic sol – Ferric hydroxide **B Chromatography**

(1) Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of R_f values (distance values may be provided).

C Tests for the functional groups present in organic compounds:

(1) Alcoholic and Carboxylic groups.

(2) Aldehydic and Ketonic

D Characteristic tests of carbohydrates and proteins in the given foodstuffs. E Preparation of Inorganic Compounds- Potash Alum

SECTION-B (Mandatory)

F Quantitative analysis

(1) (a) Preparation of the standard solution of Oxalic acid of a given volume

(b) Determination of molarity of $KMnO_4$ solution by titrating it against a standard solution of Oxalic acid.

(2) The above exercise [F 1 (a) and (b)] to be conducted using Ferrous ammonium sulphate (Mohr's salt)

G Qualitative analysis:

(1) Determination of one cation and one anion in a given salt.

Cation –NH_4^+

Anions – CO_3^{2-}, S^{2-}, SO_3^{2-}, Cl^-, CH_3COO^-

(Note: Insoluble salts excluded)

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Chemistry Part -I, Class-XII, Published by NCERT.
2. Chemistry Part -II, Class-XII, Published by NCERT.

CHEMISTRY (Code No. 043) QUESTION PAPER DESIGN CLASSES –XI and XII 2024-25

S	Domains	Total Marks	%
1	**Remembering and Understanding:** Exhibit memory of previously learned material by recalling facts, terms, basic concepts and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions and stating main ideas.	28	40
2	**Applying:** Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	21	30
3	**Analysing, Evaluating and Creating:** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	21	30

1. No chapter wise weightage. Care to be taken to cover all the chapters.
2. Suitable *internal variations may be made for generating various templates.* **Choice(s):**

- There will be no overall choice in the question paper.
- However, 33% internal choices will be given in all the sections.

Question Paper Design (Theory) 2024-25

Class XII
Biology (044)

Competencies	
Demonstrate Knowledge and Understanding	50%
Application of Knowledge / Concepts	30%
Analyse, Evaluate and Create	20%

Note:

- Typology of questions: VSA including MCQs, Assertion – Reasoning type questions; SA; LA-I; LA-II; Source-based/ Case-based/ Passage-based/ Integrated assessment questions.
- An internal choice of approximately 33% would be provided.

Suggestive verbs for various competencies

- **Demonstrate, Knowledge and Understanding**

  State, name, list, identify, define, suggest, describe, outline, summarize, etc.

- **Application of Knowledge/Concepts**

  Calculate, illustrate, show, adapt, explain, distinguish, etc.

- **Analyze, Evaluate and Create**

  Interpret, analyse, compare, contrast, examine, evaluate, discuss, construct, etc.

- Questions may be generated jointly by the external/internal examiners and used for assessment.
- The viva questions may include questions based on basic theory / principle / concept, apparatus / materials / chemicals required, procedure, precautions, sources of error etc.

Class XII

A. **Items for Identification/ familiarity with the apparatus for assessment in practicals (All experiments)** Beaker, flask, petriplates, soil from different sites - sandy, clayey, loamy,smallpotted plants, aluminium foil, paint brush, test tubes, starch solution, iodine, ice cubes,Bunsen burner/spirit lamp/water bath, large flowers, Maize inflorescence, model of developmental stages highlighting morula and blastula of frog, beads/seeds of different shapes/size/texture *Ascaris*, Cactus/*Opuntia* (model).

B. **List of Practicals**

1. Study of flowers adapted to pollination by different agencies (wind, insects).
2. Identification of T.S of morula or blastula of frog (Model).
3. Study of Mendelian inheritance pattern using beads/seeds of different sizes/texture.
4. Preparation of pedigree charts of genetic traits such as rolling of tongue, colour blindness.
5. Studyof emasculation, tagging and bagging by trying out an exercise on controlled pollination.
6. Identify common disease causing organisms like *Ascaris* (model) and learn somecommon symptoms of the disease that they cause.
7. Comment upon the morphological adaptations of plants found in xerophytic conditions.

Note: The above practicals may be carried out in an experiential manner rather than recordingobservations.

Prescribed Books:

1. Biology, Class-XII, Published by NCERT
2. Other related books and manuals brought out by NCERT (consider multimedia also)
3. Biology Supplementary Material (Revised). Available on CBSE website.

8. Controlled pollination - emasculation, tagging andbagging.
9. Common disease causing organisms like *Ascaris, Entamoeba, Plasmodium*, any funguscausing ringworm through permanent slides, models or virtual images or specimens. Comment on symptoms of diseases that they cause.
10. Models specimen showing symbolic association in root modules of leguminous plants, Cuscuta on host, lichens.
11. Flash cards models showing examples of homologous and analogous organs.

Practical Examination for Visually Impaired Students of Classes XI and XII

Evaluation Scheme

Time: 02 Hours **Max. Marks: 30**

Topic	Marks
Identification/Familiarity with the apparatus	5
Written test (Based on given / prescribed practicals)	10
Practical Records	5
Viva	10
Total	**30**

General Guidelines

- The practical examination will be of two hour duration. A separate list of ten experimentsis included here.
- The written examination in practicals for these students will be conducted at the time ofpractical examination of all other students.
- The written test will be of 30 minutes duration.
- The question paper given to the students should be legibly typed. It should contain a total of 15 practical skill based very short answer type questions. A student would be required to answer any 10 questions.
- A writer may be allowed to such students as per CBSE examination rules.
- All questions included in the question paper should be related to the listed practicals. Every question should require about two minutes to be answered.
- These students are also required to maintain a practical file. A student is expected to recordat least five of the listed experiments as per the specific instructions for each subject. Thesepracticals should be duly checked and signed by the internal examiner.
- The format of writing any experiment in the practical file should include aim, apparatus required, simple theory, procedure, related practical skills, precautions etc.

Chapter-15: Biodiversity and its Conservation

Biodiversity-Concept, patterns, importance; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, Sacred Groves, biosphere reserves, national parks, wildlife, sanctuaries and Ramsar sites.

PRACTICALS

Time allowed: 3 Hours **Max. Marks: 30**

<table>
<tr><th colspan="2">Evaluation Scheme</th><th>Marks</th></tr>
<tr><td colspan="2">One Major Experiment 5</td><td>5</td></tr>
<tr><td colspan="2">One Minor Experiment 2 & 3</td><td>4</td></tr>
<tr><td colspan="2">Slide Preparation 1 & 4</td><td>5</td></tr>
<tr><td colspan="2">Spotting</td><td>7</td></tr>
<tr><td>Practical Record + Viva Voce</td><td rowspan="2">(Credit to the student's work over the academic session may begiven)</td><td>4</td></tr>
<tr><td>Investigatory Project and its Project Record + Viva Voce</td><td>5</td></tr>
<tr><td colspan="2">Total</td><td>30</td></tr>
</table>

A. List of Experiments

1. Prepare a temporary mount to observe pollen germination.
2. Study the plant population density by quadrat method.
3. Study the plant population frequency by quadrat method.
4. Prepare a temporary mount of onion root tip to study mitosis.
5. Isolate DNA from available plant material such as spinach, green pea seeds, papaya, etc.

B. Study and observer the following (Spotting):

1. Flowers adapted to pollination by different agencies (wind, insects, birds).
2. Pollen germination on stigma through a permanent slide or scanning electron micrograph.
3. Identification of stages of gamete development, i.e., T.S. of testis and T.S. of ovary throughpermanent slides (from grasshopper/mice).
4. Meiosis in onion bud cell or grasshopper testis through permanent slides.
5. T.S. of blastula through permanent slides (Mammalian).
6. Mendelian inheritance using seeds of different colour/sizes of any plant.
7. Prepared pedigree charts of any one of the genetic traits such as rolling of tongue, blood groups, ear lobes, widow's peak and colour blindness.

Chapter-6: Molecular Basis of Inheritance
Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication; Central Dogma; transcription, genetic code, translation; gene expression and regulation - lac operon; Genome, Human and rice genome projects; DNA fingerprinting.

Chapter-7: Evolution
Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences); Darwin's contribution, modern synthetic theory of evolution; mechanism of evolution - variation (mutation and recombination) and natural selection with examples, types of natural selection; Gene flow and genetic drift; Hardy- Weinberg's principle; adaptive radiation; human evolution.

Unit-VIII: Biology and Human Welfare

Chapter-8: Human Health and Diseases
Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ring worm) and their control; Basicconcepts of immunology - vaccines; cancer, HIV and AIDS; Adolescence - drug and alcoholabuse.

Chapter-10: Microbes in Human Welfare
Microbes in food processing, industrial production, sewage treatment, energy generationand microbes as bio-control agents and bio-fertilizers. Antibiotics; production and judicioususe.

Unit-IX Biotechnology and its Applications

Chapter-11: Biotechnology - Principles and Processes
Genetic Engineering (Recombinant DNA Technology).

Chapter-12: Biotechnology and its Applications
Application of biotechnology in health and agriculture: Human insulin and vaccine production, stem cell technology, gene therapy; genetically modified organisms - Bt crops; transgenic animals;biosafety issues, biopiracy and patents.

Unit-X Ecology and Environment

Chapter-13: Organisms and Populations
Population interactions - mutualism, competition, predation, parasitism; population attributes - growth, birth rate and death rate, age distribution. (Topics excluded: Organism and its Environment, Major Aboitic Factors, Responses to Abioitic Factors, Adaptations)

Chapter-14: Ecosystem
Ecosystems: Patterns, components; productivity and decomposition; energy flow; pyramids of number, biomass, energy (Topics excluded: Ecological Succession and Nutrient Cycles).

CLASS XII (2024-25)
(THEORY)

Time: 03 Hours **Max. Marks: 70**

Unit	Title	Marks
VI	Reproduction	**16**
VII	Genetics and Evolution	**20**
VIII	Biology and Human Welfare	**12**
IX	Biotechnology and its Applications	**12**
X	Ecology and Environment	**10**
	Total	**70**

Unit-VI Reproduction

Chapter-2: Sexual Reproduction in Flowering Plants

Flower structure; development of male and female gametophytes; pollination - types, agencies and examples; out breeding devices; pollen-pistil interaction; double fertilization; post fertilization events - development of endosperm and embryo, development of seed and formation of fruit; special modes- apomixis, parthenocarpy, polyembryony; Significance of seed dispersal and fruit formation.

Chapter-3: Human Reproduction

Male and female reproductive systems; microscopic anatomy of testis and ovary; gametogenesis -spermatogenesis and oogenesis; menstrual cycle; fertilisation, embryo development upto blastocyst formation, implantation; pregnancy and placenta formation (elementary idea); parturition (elementary idea); lactation (elementary idea).

Chapter-4: Reproductive Health

Need for reproductive health and prevention of Sexually Transmitted Diseases (STDs); birth control - need and methods, contraception and medical termination of pregnancy (MTP); amniocentesis; infertility and assisted reproductive technologies - IVF, ZIFT, GIFT (elementary idea for general awareness).

Unit-VII Genetics and Evolution

Chapter-5: Principles of Inheritance and Variation

Heredity and variation: Mendelian inheritance; deviations from Mendelism – incomplete dominance, co-dominance, multiple alleles and inheritance of blood groups, pleiotropy; elementary idea of polygenic inheritance; chromosome theory of inheritance; chromosomes and genes; Sex determination - in humans, birds and honey bee; linkage and crossing over; sex linked inheritance - haemophilia, colour blindness; Mendelian disorders in humans - thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

Practical Examination for Visually Impaired Students Class XI

Note: The 'Evaluation schemes' and 'General Guidelines' for visually impaired students asgiven for Class XII may be followed.

A. Items for Identification/Familiarity with the apparatus /equipment /animal and plant material / chemicals for assessment in practicals (All experiments)

B. Equipment - compound microscope, test tube, petri dish, chromatography paper, chromatography chamber, beaker, scalpel

Chemical – alcohol

Models – Model of Human skeleton to show – Ball and socket joints of girdles and limbs, Rib cage, Honeycomb, Mollusc shell, Pigeon and Star fish, cockroach

Specimen/Fresh Material – mushroom, succulents such as *Aloe vera*/ kalenchoe, raisins, potatoes, seeds of monocot and dicot- maize and gram or any other plant, plants of Solanaceae - Brinjal, Petunia,any other

C. List of Practicals

1. Study locally available common flowering plants of the family – Solanaceae and identify type of stem (Herbaceous or Woody), type of leaves (Compound or Simple).
2. Study the parts of a compound microscope- eye piece and objective lens, mirror, stage,coarse and fine adjustment knobs.
3. Differentiate between monocot and dicot plants on the basis of venation patterns.
4. Study the following parts of human skeleton (Model): Ball and socket joints of thighand shoulder
5. Rib cage
6. Study honeybee/butterfly, snail/sheik snail through shell, Starfish, Pigeon (throughmodels).
7. Identify the given specimen of a fungus – mushroom, gymnosperm-pine cone
8. Identify and relate the experimental set up with the aim of experiment:For Potato Osmometer/endosmosis in raisins.

Note: The above practicals may be carried out in an experiential manner rather than only recordingobservations.

Prescribed Books:

1. Biology Class-XI, Published by NCERT
2. Other related books and manuals brought out by NCERT (including multimedia).

9. Study of the rate of respiration in flower buds/leaf tissue and germinating seeds.
10. Test for presence of urea in urine.
11. Test for presence of sugar in urine.
12. Test for presence of albumin in urine.
13. Test for presence of bile salts in urine.

B. Study and Observe the following (spotting):

1. Parts of a compound microscope.
2. Specimens/slides/models and identification with reasons - Bacteria, *Oscillatoria, Spirogyra, Rhizopus*, mushroom, yeast, liverwort, moss, fern, pine, one monocotyledonousplant, one dicotyledonous plant and one lichen.
3. Virtual specimens/slides/models and identifying features of - *Amoeba, Hydra,* liver fluke, *Ascaris*, leech, earthworm, prawn, silkworm, honey bee, snail, starfish, shark, rohu, frog, lizard, pigeon and rabbit.
4. Mitosis in onion root tip cells and animals cells (grasshopper) from permanent slides.
5. Different types of inflorescence (cymose and racemose).
6. Human skeleton and different types of joints with the help of virtual images/models only.

Chapter-22: Chemical Coordination and Integration

Endocrine glands and hormones; human endocrine system - hypothalamus, pituitary, pineal, thyroid, parathyroid, adrenal, pancreas, gonads; mechanism of hormone action (elementary idea); role of hormones as messengers and regulators, hypo - and hyperactivity and related disorders; dwarfism, acromegaly, cretinism, goiter, exophthalmic goitre, diabetes, Addison's disease.

Note: Diseases related to all the human physiological systems to be taught in brief.

PRACTICALS

Time: 03 Hours **Max. Marks: 30**

<table>
<tr><th colspan="2">Evaluation Scheme</th><th>Marks</th></tr>
<tr><td colspan="2">One Major Experiment Part A (Experiment No- 1,3,7,8)</td><td>5 Marks</td></tr>
<tr><td colspan="2">One Minor Experiment Part A (Experiment No- 6,9,10,11,12,13)</td><td>4 Marks</td></tr>
<tr><td colspan="2">Slide Preparation Part A (Experiment No- 2,4,5)</td><td>5 Marks</td></tr>
<tr><td colspan="2">Spotting Part B</td><td>7 Marks</td></tr>
<tr><td>Practical Record + Viva Voce</td><td rowspan="2">(Credit to the student's work overthe academic session may be given)</td><td>4 Marks</td></tr>
<tr><td>Project Record + Viva Voce</td><td>5 Marks</td></tr>
<tr><td colspan="2">Total</td><td>30 Marks</td></tr>
</table>

A: List of Experiments

1. Study and describe locally available common flowering plants, from family Solanaceae (Poaceae, Asteraceae or Brassicaceae can be substituted in case of particular geographical location) including dissection and display of floral whorls, anther and ovary to show number of chambers (floral formulae and floral diagrams), type of root (tap and adventitious); type of stem (herbaceous and woody); leaf (arrangement, shape, venation, simple and compound).
2. Preparation and study of T.S. of dicot and monocot roots and stems (primary).
3. Study of osmosis by potato osmometer.
4. Study of plasmolysis in epidermal peels (e.g. Rhoeo/lily leaves or flashy scale leaves ofonion bulb).
5. Study of distribution of stomata on the upper and lower surfaces of leaves.
6. Comparative study of the rates of transpiration in the upper and lower surfaces of leaves.
7. Test for the presence of sugar, starch, proteins and fats in suitable plant and animalmaterials.
8. Separation of plant pigments through paper chromatography.

Chapter-10: Cell Cycle and Cell Division
Cell cycle, mitosis, meiosis and their significance

Unit-IV Plant Physiology

Chapter-13: Photosynthesis in Higher Plants
Photosynthesis as a means of autotrophic nutrition; site of photosynthesis, pigments involved in photosynthesis (elementary idea); photochemical and biosynthetic phases of photosynthesis; cyclic and non-cyclic photophosphorylation; chemiosmotic hypothesis; photorespiration; C3 and C4 pathways; factors affecting photosynthesis.

Chapter-14: Respiration in Plants
Exchange of gases; cellular respiration - glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); energy relations - number of ATP molecules generated; amphibolic pathways; respiratory quotient.

Chapter-15: Plant - Growth and Development
Seed germination; phases of plant growth and plant growth rate; conditions of growth; differentiation, dedifferentiation and redifferentiation; sequence of developmental processes in a plant cell; plant growth regulators - auxin, gibberellin, cytokinin, ethylene, ABA.

Unit-V Human Physiology

Chapter-17: Breathing and Exchange of Gases
Respiratory organs in animals (recall only); Respiratory system in humans; mechanism of breathing and its regulation in humans - exchange of gases, transport of gases and regulation of respiration, respiratory volume; disorders related to respiration - asthma, emphysema, occupationalrespiratory disorders.

Chapter-18: Body Fluids and Circulation
Composition of blood, blood groups, coagulation of blood; composition of lymph and its function; human circulatory system - Structure of human heart and blood vessels; cardiac cycle, cardiac output, ECG; double circulation; regulation of cardiac activity; disorders of circulatory system - hypertension, coronary artery disease, angina pectoris, heart failure.

Chapter-19: Excretory Products and their Elimination
Modes of excretion - ammonotelism, ureotelism, uricotelism; human excretory system – structure and function; urine formation, osmoregulation; regulation of kidney function - renin - angiotensin, atrial natriuretic factor, ADH and diabetes insipidus; role of other organs in excretion; disorders - uremia, renal failure, renal calculi, nephritis; dialysis and artificial kidney, kidney transplant.

Chapter-20: Locomotion and Movement
Types of movement - ciliary, flagellar, muscular; skeletal muscle, contractile proteins and musclecontraction; skeletal system and its functions; joints; disorders of muscular and skeletal systems - myasthenia gravis, tetany, muscular dystrophy, arthritis, osteoporosis, gout.

Chapter-21: Neural Control and Coordination
Neuron and nerves; Nervous system in humans - central nervous system; peripheral nervous system and visceral nervous system; generation and conduction of nerve impulse

Unit-I Diversity of Living Organisms

Chapter-1: The Living World

Biodiversity; Need for classification; three domains of life; taxonomy and systematics; conceptof species and taxonomical hierarchy; binomial nomenclature

Chapter-2: Biological Classification

Five kingdom classification; Salient features and classification of Monera, Protista and Fungi into major groups; Lichens, Viruses and Viroids.

Chapter-3: Plant Kingdom

Classification of plants into major groups; Salient and distinguishing features and a few examples of Algae, Bryophyta, Pteridophyta, Gymnospermae (Topics excluded – Angiosperms, Plant Life Cycle and Alternation of Generations)

Chapter-4: Animal Kingdom

Salient features and classification of animals, non-chordates up to phyla level and chordates upto class level (salient features and at a few examples of each category).
(No live animals or specimen should be displayed.)

Unit-II Structural Organization in Plants and Animals

Chapter-5: Morphology of Flowering Plants

Morphology of different parts of flowering plants: root, stem, leaf, inflorescence, flower, fruit and seed. Description of family Solanaceae

Chapter-6: Anatomy of Flowering Plants

Anatomy and functions of tissue systems in dicots and monocots.

Chapter-7: Structural Organisation in Animals

Morphology, Anatomy and functions of different systems (digestive, circulatory,respiratory, nervous andreproductive) of frog.

Unit-III Cell: Structure and Function

Chapter-8: Cell-The Unit of Life

Cell theory and cell as the basic unit of life, structure of prokaryotic and eukaryotic cells; Plant cell and animal cell; cell envelope; cell membrane, cell wall; cell organelles - structure and function; endomembrane system, endoplasmic reticulum, golgi bodies, lysosomes, vacuoles, mitochondria, ribosomes, plastids, microbodies; cytoskeleton, cilia, flagella, centrioles (ultrastructure and function); nucleus.

Chapter-9: Biomolecules

Chemical constituents of living cells: biomolecules, structure and function of proteins, carbohydrates, lipids, and nucleic acids; Enzyme - types, properties, enzyme action. (Topics excluded: Nature of Bond Linking Monomers in a Polymer, Dynamic State of Body Constituents Concept of Metabolism, Metabolic Basis of Living, The Living State)

BIOLOGY (Code No. 044)
Classes XI & XII (2024-25)

The present curriculum provides the students with updated concepts along with an extended exposure to contemporary areas of the subject. The curriculum also aims at emphasizing the underlying principles that are common to animals, plants and microorganisms as well as highlighting the relationship of Biology with other areas of knowledge. The format allows a simple,clear, sequential flow of concepts. It relates the study of biology to real life through the developments in use of technology. It links the discoveries and innovations in biology to everyday life such as environment, industry, health and agriculture. The updated curriculum also focuses on understanding and application of scientific principles, while ensuring that ample opportunities and scope for learning and appreciating basic concepts continue to be available within its framework. The prescribed syllabus is expected to:

- promote understanding of basic principles of Biology
- encourage learning of emerging knowledge and its relevance to individual and society
- promote rational/scientific attitude towards issues related to population, environment and development
- enhance awareness about environmental issues, problems and their appropriate solutions
- create awareness amongst the learners about diversity in the living organisms anddeveloping respect for other living beings
- appreciate that the most complex biological phenomena are built on essentially simpleprocesses

It is expected that the students would get an exposure to various branches of Biology in thecurriculum in a more contextual and systematic manner as they study its various units.

BIOLOGY (Code No. 044)COURSE STRUCTURE
CLASS XI (2024 -25)
(THEORY)

Time: 03 Hours **Max. Marks: 70**

Unit	Title	Marks
I	Diversity of Living Organisms	15
II	Structural Organization in Plants and Animals	10
III	Cell: Structure and Function	15
IV	Plant Physiology	12
V	Human Physiology	18
	Total	**70**

Database Management

- Create a student table and insert data. Implement the following SQL commands on the student table:
    - o ALTER table to add new attributes / modify data type / drop attribute
    - o UPDATE table to modify data
    - o ORDER By to display data in ascending / descending order
    - o DELETE to remove tuple(s)
    - o GROUP BY and find the min, max, sum, count and average
- Similar exercise may be framed for other cases.
- Integrate SQL with Python by importing suitable module.

7. Suggested Reading Material

- NCERT Textbook for COMPUTER SCIENCE (Class XII)
- Support Materials on the CBSE website.

8. Project

The aim of the class project is to create something that is tangible and useful using Python file handling/ Python-SQL connectivity. This should be done in groups of two to three students and should be started by students at least 6 months before the submission deadline. The aim here is to find a real world problem that is worthwhile to solve.

Students are encouraged to visit local businesses and ask them about the problems that they are facing. For example, if a business is finding it hard to create invoices for filing GST claims, then students can do a project that takes the raw data (list of transactions), groups the transactions by category, accounts for the GST tax rates, and creates invoices in the appropriate format. Students can be extremely creative here. They can use a wide variety of Python libraries to create user friendly applications such as games, software for their school, software for their disabled fellow students, and mobile applications, of course to do some of these projects, some additional learning is required; this should be encouraged. Students should know how to teach themselves.

The students should be sensitized to avoid plagiarism and violations of copyright issues while working on projects. Teachers should take necessary measures for this.

insert, update, delete queries using cursor, display data by using connect(), cursor(), execute(), commit(), fetchone(), fetchall(), rowcount, creating database connectivity applications, use of %s format specifier or format() to perform queries

5. Practical

S.No	Unit Name	Marks (Total=30)
1	Lab Test: 1. Python program (60% logic + 20% documentation + 20% code quality)	8
	2. SQL queries (4 queries based on one or two tables)	4
2	Report file: • Minimum 15 Python programs. • SQL Queries – Minimum 5 sets using one table / two tables. • Minimum 4 programs based on Python – SQL connectivity	7
3	Project (using concepts learnt in Classes 11 and 12)	8
4	Viva voce	3

6. Suggested Practical List:

Python Programming

- Read a text file line by line and display each word separated by a #.
- Read a text file and display the number of vowels/consonants/uppercase/lowercase characters in the file.
- Remove all the lines that contain the character 'a' in a file and write it to another file.
- Create a binary file with name and roll number. Search for a given roll number and display the name, if not found display appropriate message.
- Create a binary file with roll number, name and marks. Input a roll number and update the marks.
- Write a random number generator that generates random numbers between 1 and 6 (simulates a dice).
- Write a Python program to implement a stack using list.
- Create a CSV file by entering user-id and password, read and search the password for given userid.

- Text file: opening a text file, text file open modes (r, r+, w, w+, a, a+), closing a text file, opening a file using with clause, writing/appending data to a text file using write() and writelines(), reading from a text file using read(), readline() and readlines(), seek and tell methods, manipulation of data in a text file
- Binary file: basic operations on a binary file: open using file open modes (rb, rb+, wb, wb+, ab, ab+), close a binary file, import pickle module, dump() and load() method, read, write/create, search, append and update operations in a binary file
- CSV file: import csv module, open / close csv file, write into a csv file using writer(),writerow(),writerows() and read from a csv file using reader()
- Data Structure: Stack, operations on stack (push & pop), implementation of stack using list.

Unit 2: Computer Networks

- Evolution of networking: introduction to computer networks, evolution of networking (ARPANET, NSFNET, INTERNET)
- Data communication terminologies: concept of communication, components of data communication (sender,receiver, message, communication media, protocols), measuring capacity of communication media (bandwidth, data transfer rate), IP address, switching techniques (Circuit switching, Packet switching)
- Transmission media: Wired communication media (Twisted pair cable, Co-axial cable, Fiber-optic cable), Wireless media (Radio waves, Micro waves, Infrared waves)
- Network devices (Modem, Ethernet card, RJ45, Repeater, Hub, Switch, Router, Gateway, WIFI card)
- Network topologies and Network types: types of networks (PAN, LAN, MAN, WAN), networking topologies (Bus, Star, Tree)
- Network protocol: HTTP, FTP, PPP, SMTP, TCP/IP, POP3, HTTPS, TELNET, VoIP
- Introduction to web services: WWW, Hyper Text Markup Language (HTML), Extensible Markup Language (XML), domain names, URL, website, web browser, web servers, web hosting

Unit 3: Database Management

- Database concepts: introduction to database concepts and its need
- Relational data model: relation, attribute, tuple, domain, degree, cardinality, keys (candidate key, primary key, alternate key, foreign key)
- Structured Query Language: introduction, Data Definition Language and Data Manipulation Language, data type (char(n), varchar(n), int, float, date), constraints (not null, unique, primary key), create database, use database, show databases, drop database, show tables, create table, describe table, alter table (add and remove an attribute, add and remove primary key), drop table, insert, delete, select, operators (mathematical, relational and logical), aliasing, distinct clause, where clause, in, between, order by, meaning of null, is null, is not null, like, update command, delete command, aggregate functions (max, min, avg, sum, count), group by, having clause, joins: cartesian product on two tables, equi-join and natural join
- Interface of python with an SQL database: connecting SQL with Python, performing

Computer Science (2024-25)
CLASS XII Code No. 083

1. Prerequisites

Computer Science- Class XI

2. Learning Outcomes

Student should be able to

a) apply the concept of function.

b) explain and use the concept of file handling.

c) use basic data structure: Stacks

d) explain basics of computer networks.

e) use Database concepts, SQL along with connectivity between Python and SQL.

3. Distribution of Marks:

Unit No.	Unit Name	Marks	Periods	
			Theory	Practical
1	Computational Thinking and Programming – 2	40	70	50
2	Computer Networks	10	15	…
3	Database Management	20	25	20
	Total	**70**	**110**	**70**

4. Unit wise Syllabus

Unit 1: Computational Thinking and Programming – 2

- Revision of Python topics covered in Class XI.
- Functions: types of function (built-in functions, functions defined in module, user defined functions), creating user defined function, arguments and parameters, default parameters, positional parameters, function returning value(s), flow of execution, scope of a variable (global scope, local scope)
- Exception Handling: Introduction, handling exceptions using try-except-finally blocks
- Introduction to files, types of files (Text file, Binary file, CSV file), relative and absolute paths

5. Suggested Practical List

Python Programming

- Input a welcome message and display it.
- Input two numbers and display the larger / smaller number.
- Input three numbers and display the largest / smallest number.
- Generate the following patterns using nested loops:

Pattern-1	Pattern-2	Pattern-3
* ** *** **** *****	12345 1234 123 12 1	A AB ABC ABCD ABCDE

- Write a program to input the value of x and n and print the sum of the following series:
  - $1 + x + x^2 + x^3 + x^4 + \cdots x^n$
  - $1 - x + x^2 - x^3 + x^4 - \cdots x^n$
  - $x + \frac{x^2}{2} + \frac{x^3}{3} + \frac{x^4}{4} + \cdots \frac{x^n}{n}$
  - $x + \frac{x^2}{2!} + \frac{x^3}{3!} + \frac{x^4}{4!} + \cdots \frac{x^n}{n!}$
- Determine whether a number is a perfect number, an Armstrong number or a palindrome.
- Input a number and check if the number is a prime or composite number.
- Display the terms of a Fibonacci series.
- Compute the greatest common divisor and least common multiple of two integers.
- Count and display the number of vowels, consonants, uppercase, lowercase characters in string.
- Input a string and determine whether it is a palindrome or not; convert the case of characters in a string.
- Find the largest/smallest number in a list/tuple
- Input a list of numbers and swap elements at the even location with the elements at the odd location.
- Input a list/tuple of elements, search for a given element in the list/tuple.
- Create a dictionary with the roll number, name and marks of n students in a class and display the names of students who have marks above 75.

6. Suggested Reading Material

- NCERT Textbook for Computer Science (Class XI)
- Support Material on CBSE website

search on a tuple of numbers, counting the frequency of elements in a tuple.

- Dictionary: introduction, accessing items in a dictionary using keys, mutability of a dictionary (adding a new term, modifying an existing item), traversing a dictionary, built-in functions/methods – len(), dict(), keys(), values(), items(), get(), update(), del, clear(), fromkeys(), copy(), pop(), popitem(), setdefault(), max(), min(), sorted(); Suggested programs: count the number of times a character appears in a given string using a dictionary, create a dictionary with names of employees, their salary and access them.
- Introduction to Python modules: Importing module using 'import <module>' and using from statement, importing math module (pi, e, sqrt(), ceil(), floor(), pow(), fabs(), sin(), cos(), tan()); random module (random(), randint(), randrange()), statistics module (mean(), median(), mode()).

Unit 3: Society, Law and Ethics

- Digital Footprints
- Digital Society and Netizen: net etiquettes, communication etiquettes, social media etiquettes
- Data Protection: Intellectual property rights (copyright, patent, trademark), violation of IPR (plagiarism, copyright infringement, trademark infringement), open source software and licensing (Creative Commons, GPL and Apache)
- Cyber Crime: definition, hacking, eavesdropping, phishing and fraud emails, ransomware, cyber trolls, cyber bullying
- Cyber safety: safely browsing the web, identity protection, confidentiality
- Malware: viruses, trojans, adware
- E-waste management: proper disposal of used electronic gadgets.
- Information Technology Act (IT Act)
- Technology and society: Gender and disability issues while teaching and using computers

4. Practical

S.No.	Unit Name	Marks (Total=30)
1.	**Lab Test (12 marks)**	
	Python program (60% logic + 20% documentation + 20% code quality)	**12**
2.	**Report File + Viva (10 marks)**	
	Report file: Minimum 20 Python programs	**7**
	Viva voce	**3**
3.	Project (that uses most of the concepts that have been learnt)	**8**

conversion between number systems
- Encoding Schemes: ASCII, ISCII, and Unicode (UTF8, UTF32)

Unit 2: Computational Thinking and Programming - I

- Introduction to Problem-solving: Steps for Problem-solving (Analyzing the problem, developing an algorithm, coding, testing, and debugging), representation of algorithms using flowchart and pseudocode, decomposition
- Familiarization with the basics of Python programming: Introduction to Python, Features of Python, executing a simple "hello world" program, execution modes: interactive mode and script mode, Python character set, Python tokens(keyword, identifier, literal, operator, punctuator), variables, concept of l-value and r-value, use of comments
- Knowledge of data types: Number(integer, floating point,complex), boolean, sequence(string, list, tuple), None, Mapping(dictionary), mutable and immutable data types.
- Operators: arithmetic operators, relational operators, logical operators, assignment operators, augmented assignment operators, identity operators (is, is not), membership operators (in not in)
- Expressions, statement, type conversion, and input/output: precedence of operators, expression, evaluation of an expression, type-conversion (explicit and implicit conversion), accepting data as input from the console and displaying output.
- Errors- syntax errors, logical errors, and run-time errors
- Flow of Control: introduction, use of indentation, sequential flow, conditional and iterative flow
- Conditional statements: if, if-else, if-elif-else, flowcharts, simple programs: e.g.: absolute value, sort 3 numbers and divisibility of a number.
- Iterative Statement: for loop, range(), while loop, flowcharts, break and continue statements, nested loops, suggested programs: generating pattern, summation of series, finding the factorial of a positive number, etc.
- Strings: introduction, string operations (concatenation, repetition, membership and slicing), traversing a string using loops, built-in functions/methods–len(), capitalize(), title(), lower(), upper(), count(), find(), index(), endswith(), startswith(), isalnum(), isalpha(), isdigit(), islower(), isupper(), isspace(),lstrip(), rstrip(), strip(), replace(), join(), partition(), split()
- Lists: introduction, indexing, list operations (concatenation, repetition, membership and slicing), traversing a list using loops, built-in functions/methods–len(), list(), append(), extend(), insert(), count(), index(), remove(), pop(), reverse(), sort(), sorted(), min(), max(), sum(); nested lists, suggested programs: finding the maximum, minimum, mean of numeric values stored in a list; linear search on list of numbers and counting the frequency of elements in a list.
- Tuples: introduction, indexing, tuple operations (concatenation, repetition, membership and slicing); built-in functions/methods – len(), tuple(), count(), index(), sorted(), min(), max(), sum(); tuple assignment, nested tuple; suggested programs: finding the minimum, maximum, mean of values stored in a tuple; linear

Computer Science (2024-25)
CLASS XI Code No. 083

1. Learning Outcomes

Students should be able to:

a) develop basic computational thinking
b) explain and use data types
c) appreciate the notion of algorithms
d) develop a basic understanding of computer systems- architecture and operating system
e) explain cyber ethics, cyber safety, and cybercrime
f) understand the value of technology in societies along with consideration of gender and disability issues.

2. Distribution of Marks

Unit No.	Unit Name	Marks	Periods	
			Theory	Practical
1	Computer Systems and Organisation	10	10	10
2	Computational Thinking and Programming -1	45	80	60
3	Society, Law, and Ethics	15	20	—
	Total	**70**	**110**	**70**

3. Unit wise Syllabus

Unit 1: Computer Systems and Organisation

- Basic computer organisation: Introduction to Computer System, hardware, software, input device, output device, CPU, memory (primary, cache and secondary), units of memory (bit, byte, KB, MB, GB, TB, PB)
- Types of software: System software (Operating systems, system utilities, device drivers), programming tools and language translators (assembler, compiler, and interpreter), application software
- Operating System(OS): functions of the operating system, OS user interface
- Boolean logic: NOT, AND, OR, NAND, NOR, XOR, NOT, truth tables and De Morgan's laws, Logic circuits
- Number System: Binary, Octal, Decimal and Hexadecimal number system;

Assessment Plan

1. Overall Assessment of the course is out of 100 marks.
2. The assessment plan consists of an External Exam and Internal Assessment.
3. External Exam will be of 03 hours duration Pen/ Paper Test consisting of 80 marks.
4. The weightage of the Internal Assessment is 20 marks. Internal Assessment can be a combination of activities spread throughout the semester/ academic year. Internal Assessment activities include projects and excel based practical. Teachers can choose activities from the suggested list of practical or they can plan activities of a similar nature. For data-based practical, teachers are encouraged to use data from local sources to make it more relevant for students.
5. Weightage for each area of internal assessment may be as under:

Sl. No.	Area and Weightage	Assessment Area	Marks allocated
1	Project work (10 marks)	Project work and record	5
		Year-end Presentation/ Viva of the Project	5
2	Practical work (10 marks)	Performance of practical and record	5
		Year-end test of any one practical	5
		Total	20

vii) Fibonacci sequence: Its' history and presence in nature
viii) Testing the validity of mathematical statements and framing truth tables
ix) Investigating Graphs of functions for their properties
x) Visit the census site of India http://www.censusindia.gov.in/Census_Data_2001/Census_Data_Online/Language/State ment3.htm Depict the information given there in a pictorial form
xi) Prepare a questionnaire to collect information about money spent by your friends in a month on activities like travelling, movies, recharging of the mobiles, etc. and draw interesting conclusions
xii) Check out the local newspaper and cut out examples of information depicted by graphs. Draw your own conclusions from the graph and compare it with the analysis given in the report
xiii) Analysis of population migration data – positive and negative influence on urbanization
xiv) Each day newspaper tells us about the maximum temperature, minimum temperature, and humidity. Collect the data for a period of 30 days and represent it graphically. Compare it with the data available for the same time period for the previous year
xv) Analysis of career graph of a cricketer (batting average for a batsman and bowling average for a bowler). Conclude the best year of his career. It may be extended for other players also – tennis, badminton, athlete
xvi) Vehicle registration data – correlating with pollution and the number of accidents
xvii) Visit a village near Delhi and collect data of various crops over the past few years from the farmers. Also, collect data about temperature variation and rain over the period for a particular crop. Try to find the effect of temperature and rain variations on various crops
xviii) Choose any week of your ongoing semester. Collect data for the past 10 – 15 years for the amount of rainfall received in Delhi during that week. Predict the amount of rainfall for the current year
xix) Weather prediction (prediction of monsoon from past data)
xx) Visit Kirana shops near your home and collect the data regarding the sales of certain commodities over a month. Try to figure out the stock of a particular commodity which should be in the store in order to maximize the profit
xxi) Stock price movement
xxii) Risk assessments by insurance firms from data
xxiii) Predicting stock market crash
xxiv) Predicting the outcome of an election – exit polls
xxv) Predicting mortality of infants

8.2	Mathematical formulation of Linear Programming Problem	• Formulate Linear Programming Problem	• Set the problem in terms of decision variables, identify the objective function, identify the set of problem constraints, express the problem in terms of inequations
8.3	Different types of Linear Programming Problems	• Identify and formulate different types of LPP	• Formulate various types of LPP's like Manufacturing Problem, Diet Problem, Transportation Problem, etc.
8.4	Graphical method of solution for problems in two variables	• Draw the Graph for a system of linear inequalities involving two variables and to find its solution graphically	• Corner Point Method for the Optimal solution of LPP • Iso-cost/ Iso-profit Method
8.5	Feasible and Infeasible Regions	• Identify feasible, infeasible, bounded and unbounded regions	• Definition and Examples to explain the terms
8.6	Feasible and infeasible solutions, optimal feasible solution	• Understand feasible and infeasible solutions • Find optimal feasible solution	• Problems based on optimization • Examples of finding the solutions by graphical method

Practical: Use of spreadsheet

Graphs of an exponential function, demand and supply functions on Excel and study the nature of function at various points, maxima/minima, Matrix operations using Excel

Suggested practical using the spreadsheet

i) Plot the graphs of functions on excel and study the graph to find out the point of maxima/minima
ii) Probability and dice roll simulation
iii) Matrix multiplication and the inverse of a matrix
iv) Stock Market data sheet on excel
v) Collect the data on weather, price, inflation, and pollution analyze the data and make meaningful inferences
vi) Collect data from newspapers on traffic, sports activities and market trends and use excel to study future trends

List of Suggested projects (Class XI /XII)

i) Use of prime numbers in coding and decoding of messages
ii) Prime numbers and divisibility rules
iii) Logarithms for financial calculations such as interest, present value, future value, profit/loss etc. with large values)
iv) The cardinality of a set and orders of infinity
v) Comparing sets of Natural numbers, rational numbers, real numbers and others
vi) Use of Venn diagram in solving practical problems

6.5	Components of Time Series	• Distinguish between different components of time series	• Secular trend • Seasonal variation • Cyclical variation • Irregular variation
6.6	Time Series analysis for univariate data	• Solve practical problems based on statistical data and Interpret the result	• Fitting a straight line trend and estimating the value
6.7	Secular Trend	• Understand the long term tendency	• The tendency of the variable to increase or decrease over a long period of time
6.8	Methods of Measuring trend	• Demonstrate the techniques of finding trend by different methods	• Moving Average method • Method of Least Squares
UNIT - 7	**FINANCIAL MATHEMATICS**		
7.1	Perpetuity, Sinking Funds	• Explain the concept of perpetuity and sinking fund • Calculate perpetuity • Differentiate between sinking fund and saving account	• Meaning of Perpetuity and Sinking Fund • Real life examples of sinking fund • Advantages of Sinking Fund • Sinking Fund vs. Savings account
7.3	Calculation of EMI	• Explain the concept of EMI • Calculate EMI using various methods	• Methods to calculate EMI: i) Flat-Rate Method ii) Reducing-Balance Method • Real life examples to calculate EMI of various types of loans, purchase of assets, etc.
7.4	Calculation of Returns, Nominal Rate of Return	• Explain the concept of rate of return and nominal rate of return • Calculate rate of return and nominal rate of return	• Formula for calculation of Rate of Return, Nominal Rate of Return
7.5	Compound Annual Growth Rate	• Understand the concept of Compound Annual Growth Rate • Differentiate between Compound Annual Growth Rate and Annual Growth Rate • Calculate Compound Annual Growth Rate	• Meaning and use of Compound Annual Growth Rate • Formula for Compound Annual Growth Rate
7.7	Linear method of Depreciation	• Define the concept of linear method of Depreciation • Interpret cost, residual value and useful life of an asset from the given information • Calculate depreciation	• Meaning and formula for Linear Method of Depreciation • Advantages and disadvantages of Linear Method
UNIT - 8	**LINEAR PROGRAMMING**		
8.1	Introduction and related terminology	• Familiarize with terms related to Linear Programming Problem	• Need for framing linear programming problem • Definition of Decision Variable, Constraints, Objective function, Optimization and Non Negative conditions

UNIT - 5	**INFERENTIAL STATISTICS**		
5.1	Population and Sample	• Define Population and Sample • Differentiate between population and sample • Define a representative sample from a population • Differentiate between a representative and non-representative sample • Draw a representative sample using simple random sampling • Draw a representative sample using and systematic random sampling	• Population data from census, economic surveys and other contexts from practical life • Examples of drawing more than one sample set from the same population • Examples of representative and non-representative sample • Unbiased and biased sampling • Problems based on random sampling using simple random sampling and systematic random sampling (sample size less than 100) •
5.2	Parameter and Statistics and Statistical Interferences	• Define Parameter with reference to Population • Define Statistics with reference to Sample • Explain the relation between Parameter and Statistic • Explain the limitation of Statistic to generalize the estimation for population • Interpret the concept of Statistical Significance and Statistical Inferences • State Central Limit Theorem • Explain the relation between Population-Sampling Distribution-Sample	• Conceptual understanding of Parameter and Statistics • Examples of Parameter and Statistic limited to Mean and Standard deviation only • Examples to highlight limitations of generalizing results from sample to population • Only conceptual understanding of Statistical Significance/Statistical Inferences • Only conceptual understanding of Sampling Distribution through simulation and graphs
5.3	t-Test (one sample t-test and two independent groups t-test)	• Define a hypothesis • Differentiate between Null and Alternate hypothesis • Define and calculate degree of freedom • Test Null hypothesis and make inferences using t-test statistic for one group / two independent groups	• Examples and non-examples of Null and Alternate hypothesis (only non-directional alternate hypothesis) • Framing of Null and Alternate hypothesis • Testing a Null Hypothesis to make Statistical Inferences for small sample size • (for small sample size: t- test for one group and two independent groups • Use of t-table
UNIT – 6	**INDEX NUMBERS AND TIME BASED DATA**		
6.4	Time Series	• Identify time series as chronological data	• Meaning and Definition

3.11	Formulating and Solving Differential Equations	• Formulate differential equation • Verify the solution of differential equation • Solve simple differential equation	• Formation of differential equation by eliminating arbitrary constants • Solution of simple differential equations (direct integration only)
3.12	Application of Differential Equations	• Define Growth and Decay Model • Apply the differential equations to solve Growth and Decay Models	• Growth and Decay Model in Biological sciences, Economics and business, etc.
UNIT- 4	**PROBABILITY DISTRIBUTIONS**		
4.1	Probability Distribution	• Understand the concept of Random Variables and its Probability Distributions • Find probability distribution of discrete random variable	• Definition and example of discrete and continuous random variable and their distribution
4.2	Mathematical Expectation	• Apply arithmetic mean of frequency distribution to find the expected value of a random variable	• The expected value of discrete random variable as summation of product of discrete random variable by the probability of its occurrence.
4.3	Variance	• Calculate the Variance and S.D. of a random variable	• Questions based on variance and standard deviation
4.4	Binomial Distribution	• Identify the Bernoulli Trials and apply Binomial Distribution • Evaluate Mean, Variance and S.D of a binomial distribution	• Characteristics of the binomial distribution • Binomial formula: $P(r) = {}^nC_r\ p^r q^{n-r}$ Where n = number of trials P = probability of success q = probability of failure Mean =np Variance = npq Standard Deviation = $\sqrt{npq}$
4.5	Poison Distribution	• Understand the Conditions of Poisson Distribution • Evaluate the Mean and Variance of Poisson distribution	• Characteristics of Poisson Probability distribution Poisson formula: $P(x) = \frac{\lambda^x \cdot e^{-\lambda}}{x!}$ • Mean = Variance = λ
4.6	Normal Distribution	• Understand normal distribution is a Continuous distribution • Evaluate value of Standard normal variate • Area relationship between Mean and Standard Deviation	• Characteristics of a normal probability distribution • Total area under the curve = total probability = 1 • Standard Normal Variate: $Z = \frac{x-\mu}{\sigma}$ where x = value of the random variable μ = mean σ = S.D.

3.4	Increasing /Decreasing Functions	• Determine whether a function is increasing or decreasing • Determine the conditions for a function to be increasing or decreasing	• Simple problems related to increasing and decreasing behaviour of a function in the given interval
3.5	Maxima and Minima	• Determine critical points of the function • Find the point(s) of local maxima and local minima and corresponding local maximum and local minimum values • Find the absolute maximum and absolute minimum value of a function • Solve applied problems	• A point x= c is called the critical point of f if f is defined at c and $f'(c) =$ 0 or f is not differentiable at c • To find local maxima and local minima by: i) First Derivative Test ii) Second Derivative Test • Contextualized real life problems
Integration and its Applications			
3.6	Integration	• Understand and determine indefinite integrals of simple functions as anti-derivative	• Integration as a reverse process of differentiation • Vocabulary and Notations related to Integration
3.7	Indefinite Integrals as family of curves	• Evaluate indefinite integrals of simple algebraic functions by method of: i) substitution ii) partial fraction iii) by parts	• Simple integrals based on each method (non-trigonometric function)
3.8	Definite Integrals as area under the curve	• Define definite integral as area under the curve • Understand fundamental theorem of Integral calculus and apply it to evaluate the definite integral • Apply properties of definite integrals to solve the problems	• Evaluation of definite integrals using properties
3.9	Application of Integration	• Identify the region representing C.S. and P.S. graphically • Apply the definite integral to find consumer surplus-producer surplus	Problems based on finding • Total cost when Marginal Cost is given • Total Revenue when Marginal Revenue is given • Equilibrium price and equilibrium quantity and hence consumer and producer surplus
Differential Equations and Modeling			
3.10	Differential Equations	• Recognize a differential equation • Find the order and degree of a differential equation	• Definition, order, degree and examples

2.3	Algebra of Matrices	• Perform operations like addition & subtraction on matrices of same order • Perform multiplication of two matrices of appropriate order • Perform multiplication of a scalar with matrix	• Addition and Subtraction of matrices • Multiplication of matrices (It can be shown to the students that Matrix multiplication is similar to multiplication of two polynomials) • Multiplication of a matrix with a real number
2.4	Determinants	• Find determinant of a square matrix • Use elementary properties of determinants	• Singular matrix, Non-singular matrix • $\|AB\|=\|A\|\|B\|$ • Simple problems to find determinant value
2.5	Inverse of a matrix	• Define the inverse of a square matrix • Apply properties of inverse of matrices	• Inverse of a matrix using: a) cofactors If A and B are invertible square matrices of same size, i) $(AB)^{-1}=B^{-1}A^{-1}$ ii) $(A^{-1})^{-1}=A$ iii) $(A^{T})^{-1}=(A^{-1})^{T}$
2.6	Solving system of simultaneous equations using matrix method, Cramer's rule and	• Solve the system of simultaneous equations using i) Cramer's Rule ii) Inverse of coefficient matrix • Formulate real life problems into a system of simultaneous linear equations and solve it using these methods	• Solution of system of simultaneous equations upto three variables only (non- homogeneous equations)
UNIT- 3 CALCULUS			
Differentiation and its Applications			
3.1	Higher Order Derivatives	• Determine second and higher order derivatives • Understand differentiation of parametric functions and implicit functions	• Simple problems based on higher order derivatives • Differentiation of parametric functions and implicit functions (upto 2^{nd} order)
3.2	Application of Derivatives	• Determine the rate of change of various quantities • Understand the gradient of tangent and normal to a curve at a given point • Write the equation of tangents and normal to a curve at a given point	• To find the rate of change of quantities such as area and volume with respect to time or its dimension • Gradient / Slope of tangent and normal to the curve • The equation of the tangent and normal to the curve (simple problems only)
3.3	Marginal Cost and Marginal Revenue using derivatives	• Define marginal cost and marginal revenue • Find marginal cost and marginal revenue	• Examples related to marginal cost, marginal revenue, etc.

CLASS XII

Sl. No.	Contents	Learning Outcomes: Students will be able to	Notes / Explanation
UNIT-1	**NUMBERS, QUANTIFICATION AND NUMERICAL APPLICATIONS**		
1.1	Modulo Arithmetic	• Define modulus of an integer • Apply arithmetic operations using modular arithmetic rules	• Definition and meaning • Introduction to modulo operator • Modular addition and subtraction
1.2	Congruence Modulo	• Define congruence modulo • Apply the definition in various problems	• Definition and meaning • Solution using congruence modulo • Equivalence class
1.4	Alligation and Mixture	• Understand the rule of alligation to produce a mixture at a given price • Determine the mean price of a mixture • Apply rule of alligation	• Meaning and Application of rule of alligation • Mean price of a mixture
1.5	Numerical Problems	Solve real life problems mathematically	
	Boats and Streams (upstream and downstream)	• Distinguish between upstream and downstream • Express the problem in the form of an equation	• Problems based on speed of stream and the speed of boat in still water
	Pipes and Cisterns	• Determine the time taken by two or more pipes to fill or empty the tank	• Calculation of the portion of the tank filled or drained by the pipe(s) in unit time
	Races and Games	• Compare the performance of two players w.r.t. time, distance	• Calculation of the time taken/ distance covered / speed of each player
1.6	Numerical Inequalities	• Describe the basic concepts of numerical inequalities • Understand and write numerical inequalities	• Comparison between two statements/situations which can be compared numerically • Application of the techniques of numerical solution of algebraic inequations
UNIT-2	**ALGEBRA**		
2.1	Matrices and types of matrices	• Define matrix • Identify different kinds of matrices • Find the size / order of matrices	• The entries, rows and columns of matrices • Present a set of data in a matrix form
2.2	Equality of matrices, Transpose of a matrix, Symmetric and Skew symmetric matrix	• Determine equality of two matrices • Write transpose of given matrix • Define symmetric and skew symmetric matrix	• Examples of transpose of matrix • A square matrix as a sum of symmetric and skew symmetric matrix • Observe that diagonal elements of skew symmetric matrices are always zero

Grade XII (2024-25)

Number of Paper: 1

Total number of Periods: 240 (35 Minutes Each)

Time: 3 Hours

Max Marks: 80

No.	Units	No. of Periods	Marks
I	Numbers, Quantification and Numerical Applications	30	11
II	Algebra	20	10
III	Calculus	50	15
IV	Probability Distributions	35	10
V	Inferential Statistics	10	05
VI	Index Numbers and Time-based data	30	06
VII	Financial Mathematics	50	15
VIII	Linear Programming	15	08
Total		240	80
Internal Assessment			20

Practical: Use of spreadsheet

Calculating average, interest (simple and compound), creating pictographs, drawing pie chart, bar graphs, calculating central tendency visualizing graphs (straight line, circles and parabola using real-time data)

Suggested practical using spreadsheet

1. Plot the graph of functions on excel study the nature of function at various points, drawing lines of tangents
2. Create a budget of income and spending
3. Create and compare sheet of price & features to buy a product
4. Prepare the best option plan to buy a product by comparing cost, shipping charges, tax and other hidden costs
5. Smart purchasing during sale season
6. Prepare a report card using scores of the last four exams and compare the performance
7. Collect the data on weather, price, inflation, and pollution. Sketch different types of graphs and analyze the results

		Goods and Services Tax (SGST) Central Goods and Services Tax (CGST) and Union Territory Goods and Services Tax (UTGST)	• Assess the Individuals under Income Tax Act • Formula for GST Different Tax heads under GST
7.9	Bills, tariff rates, fixed charge, surcharge, service charge	• Describe the meaning of bills and its various types • Analyze the meaning and rules determining tariff rates • Explain the concept of fixed charge	• Tariff rates- its basis of determination • Concept of fixed charge service charge and their applications in various sectors of Indian economy
7.10	Calculation and interpretation of electricity bill, water supply bill and other supply bills	• To interpret and analyze electricity bills, water bills and other supply bills • Evaluate how to calculate units consumed under electricity bills/water bill	• Components of electricity bill/water supply and other supply bills: i) overcharging of electricity ii) water supply bills iii) units consumed in electricity bills
UNIT – 8 COORDINATE GEOMETRY			
8.1	Straight line	• Find the slope and equation of line in various form • Find angle between the two lines • Find the perpendicular from a given point on a line • Find the distance between two parallel lines	• Gradient of a line • Equation of line: Parallel to axes, point-slope form, two-points form, slope intercept form, intercept form • Application of the straight line in demand curve related to economics problems
8.2	Circle	• Define a circle • Find different form of equations of a circle • Solve problems based on applications of circle	• Circle as a locus of a point in a plane • Equation of a circle in standard form, central form, diameter form and general form
8.3	Parabola	• Define parabola and related terms • Define eccentricity of a parabola • Derive the equation of parabola	• Parabola as a locus of a point in a plane. • Equation of a parabola in standard form: • Focus, Directrix, Axis, Latus rectum, Eccentricity • Application in parabolic reflector, beam supported by wires at the end of the support, girder of a railway bridge, etc.

		• Solve Practical applications of interest rate	
7.2	Accumulation with simple and compound interest	• Interpret the concept of simple and compound interest • Calculate Simple Interest and Compound Interest	• Meaning and significance of simple and compound interest • Compound interest rates applications on various financial products
7.3	Simple and compound interest rates with equivalency	• Explain the meaning, nature and concept of equivalency • Analyze various examples for understanding annual equivalency rate	• Concept of Equivalency • Annual Equivalency Rate
7.4	Effective rate of interest	• Define with examples the concept of effective rate of interest	• Effective Annual Interest Rate $= (1 + i/n)^n - 1$ where: i = Nominal Interest Rate n = No. of Periods
7.5	Present value, net present value and future value	• Interpret the concept of compounding and discounting along with practical applications • Compute net present value • Apply net present value in capital budgeting decisions	• Formula for Present Value: $PV = CF/(1 + r)^n$ Where: CF = Cash Flow in Future Period r = Periodic Rate of return or Interest (also called the discount rate or the required rate of return) n = no. of periods • Use of PVAF, FVAF tables for practical purposes • Solve problems based on Application of net present value
7.6	Annuities, Calculating value of Regular Annuity	• Explain the concept of Immediate Annuity, Annuity due and Deferred Annuity • Calculate General Annuity	• Definition, Formulae and Examples
7.7	Simple applications of regular annuities (upto 3 period)	• Calculate the future value of regular annuity, annuity due • Apply the concept of Annuity in real life situations	• Examples of regular annuity: Mortgage Payment, Car Loan Payments, Leases, Rent Payment, Insurance payouts etc.
7.8	Tax, calculation of tax, simple applications of tax calculation in Goods and service tax, Income Tax	• Explain fundamentals of taxation • Differentiate between Direct and indirect tax • Define and explain GST • Calculate GST • Explain rules under-State	• Computation of income tax Add Income from Salary, house property, business or profession, capital gain, other sources, etc. Less deductions PF, PPF, LIC, Housing loan, FD, NSC etc.

			then: $P(E_i\|A) = \frac{P(E_i)P(A\|E_i)}{\sum_{j=1}^{n} P(E_j)P(A\|E_j)}$
UNIT- 6 DESCRIPTIVE STATISTICS			
6.4	Data Interpretation		
	Measure of Dispersion	• Understand meaning of dispersion in a data set • Differentiate between range, quartile deviation, mean deviation and standard deviation • Calculate range, quartile deviation, mean deviation and standard deviation for ungrouped and grouped data set • Choose appropriate measure of dispersion to calculate spread of data	• Mean deviation around mean and median • Standard deviation and variance • Examples of different kinds of data helping students to choose and compare different measures of dispersion
	Skewness and Kurtosis	• Define Skewness and Kurtosis using graphical representation of a data set • Interpret Skewness and Kurtosis of a frequency distribution by plotting the graph • Calculate coefficient of Skewness and interpret the results	• Examples of symmetrical and asymmetrical data • Visualization of graphical representation of data using Excel Spreadsheet or any other computer assisted tool
6.5	Percentile rank and Quartile rank	• Define Percentile rank and Quartile rank • Calculate and interpret Percentile and Quartile rank of scores in a given data set	• Emphasis on visualizing, analysing and interpreting percentile and quartile rank scores
6.6	Correlation	• Define correlation in values of two data sets • Calculate Product moment correlation for ungrouped and grouped data • Calculate Karl Pearson's coefficient of correlation • Calculate Spearman's rank correlation • Interpret the coefficient of correlation	• Emphasis on application, analysis and interpreting the results of coefficient of correlation using practical examples
UNIT – 7 FINANCIAL MATHEMATICS			
7.1	Interest and Interest Rates	• Define the concept of Interest Rates • Compare the difference between Nominal Interest Rate, Effective Rate and Real Interest Rate	• Impact of high interest rates and low interest rates on the business

			function, Signum function
4.5	Concepts of limits and continuity of a function	• Define limit of a function • Solve problems based on the algebra of limits • Define continuity of a function	• Left hand limit, Right hand limit, Limit of a function, Continuity of a function
4.6	Instantaneous rate of change	• Define instantaneous rate of change	• The ratio $\frac{\Delta y}{\Delta x} = \frac{f(x+\Delta x)-f(x)}{\Delta x}$ as instantaneous rate of change, where Δy is change in y and Δx is change in x at any instant
4.7	Differentiation as a process of finding derivative	• Find the derivative of the functions	• Derivatives of functions (non-trigonometric only)
4.8	Derivatives of algebraic functions using Chain Rule	• Find the derivative of function of a function	• If $y = f(u)$ where $u = g(x)$ then differential coefficient of y w.r.t x is $\frac{dy}{dx} = \frac{dy}{du}.\frac{du}{dx}$
UNIT – 5 PROBABILITY			
5.1	Introduction	• Appreciate the use of probability in daily life situations	• Probability as quantitative measure of uncertainty • Use of probability in determining the insurance premium, weather forecasts etc.
5.2	Random experiment and sample space	• Define random experiment and sample space with suitable examples	• Sample space as set of all possible outcomes
5.3	Event	• Define an event • Recognize and differentiate different types of events and find their probabilities	• Types of Event: Impossible and sure event, Independent and dependent event, mutually exclusive and exhaustive event
5.4	Conditional Probability	• Define the concept of conditional probability • Apply reasoning skills to solve problems based on conditional probability	• Conditional Probability of event E given that F has occurred is: $P(E\|F) = \frac{P(E\cap F)}{P(F)}$, $P(F) \neq 0$
5.5	Total Probability	• Interpret mathematical information and identify situations when to apply total probability • Solve problems based on application of total probability	• Total Probability: Let $E_1, E_2, \ldots, E_n$ be a partition of the sample space S, then probability of an event A associated with S is: $P(A) = \sum_{j=1}^{n} P(E_j)P(A\|E_j)$
5.6	Bayes' Theorem	• State Bayes' theorem • Solve practical problems based on Bayes' Theorem	• Bayes' Theorem: If $E_1, E_2, \ldots, E_n$ be n non empty events which constitute a partition of a sample space S and A be any event with non zero probability,

2.17	Permutations	• Define permutation • Apply the concept of permutation to solve simple problems	• Permutation as arrangement of objects in a definite order taken some or all at a time • Theorems under different conditions resulting in ${}^{n}P_{r}=\frac{n!}{(n-r)!}$ or n^r or $\frac{n!}{n_1!n_2!..n_k!}$ arrangements
2.20	Combinations	• Define combination • Differentiate between permutation and combination • Apply the formula of combination to solve the related problems	-The number of combinations of n different objects taken r at a time is given by ${}^{n}C_{r}=\frac{n!}{r!.(n-r)!}$ Some results on combinations: • ${}^{n}C_{0} = 1 = {}^{n}C_{n}$ • ${}^{n}C_{a} = {}^{n}C_{b} \Rightarrow$ a=b or a+ b=n • ${}^{n}C_{r} = {}^{n}C_{n-r}$ • ${}^{n}C_{r} + {}^{n}C_{r-1} = {}^{n+1}C_{r}$
UNIT -3 MATHEMATICAL REASONING			
3.2	Logical reasoning	• Solve logical problems involving odd man out, syllogism, blood relation and coding decoding	• Odd man out • Syllogism • Blood relations • Coding Decoding
UNIT – 4 CALCULUS			
4.1	Functions	• Identify dependent and independent variables • Define a function using dependent and independent variable	• Dependent variable and independent variable • Function as a rule or law that defines a relationship between one variable (the independent variable) and another variable (the dependent variable)
4.2	Domain and Range of a function	• Define domain, range and co-domain of a given function	• Domain as a set of all values of independent variable • Co-domain as a set of all values of dependent variable • Range of a function as set of all possible resulting values of dependent variable
4.3	Types of functions	• Define various types of functions • Identify domain, co-domain and range of the function	• Following types of functions with definitions and characteristics Constant function, Identity function, Polynomial function, Rational function, Composite function, Logarithm function, Exponential function, Modulus function, Greatest integer function, Signum function, Algebraic function
4.4	Graphical representation of functions	• Representation of function graphically	• Graph of some polynomial functions, Logarithm function, Exponential Function, Modulus function, Greatest integer

		elements in a Cartesian product of two sets	
2.9	Relations	• Express relation as a subset of Cartesian product • Find domain and range of a relation	• Definition of Relation, examples pertaining to relations in the real number system
Sequences and Series			
2.11	Sequence and Series	• Differentiate between sequence and series	• Sequence:$a_1, a_2, a_3, \ldots, a_n$ • Series: $a_1 + a_2 + a_3 + \cdots + a_n$
2.12	Arithmetic Progression	• Identify Arithmetic Progression (AP) • Establish the formulae of finding n^{th}term and sum of n terms • Solve application problems based on AP • Find arithmetic mean (AM) of two positive numbers	• General term of AP: $t_n = a + (n-1)d$ • Sum of n terms of AP : $S_n = \frac{n}{2}[2a + (n-1)d]$ AM of a and $b = \frac{a+b}{2}$
2.13	Geometric Progression	• Identify Geometric Progression (GP) • Derive the n^{th}term and sum of n terms of a given GP • Solve problems based on applications of GP • Find geometric mean (GM) of two positive numbers • Solve problems based on relation between AM and GM	• General term of GP: $t_n = ar^{n-1}$ • Sum of n terms of a GP: $S_n = \frac{a(r^n-1)}{r-1}$ • Sum of infinite term of GP = $\frac{a}{1-r}$, where $-1 < r < 1$ • Geometric mean of a and b = $\sqrt{ab}$ • For two positive numbers a and b, AM ≥GM i.e., $\frac{a+b}{2} \geq \sqrt{ab}$
2.14	Applications of AP and GP	• Apply appropriate formulas of AP and GP to solve application problems	Applications based on • Economy Stimulation • The Virus spread etc.
Permutations and Combinations			
2.15	Factorial	• Define factorial of a number • Calculate factorial of a number	• Definition of factorial: n! = n(n-1)(n-2)…3.2.1 Usage of factorial in counting principles
2.16	Fundamental Principle of Counting	• Appreciate how to count without counting	• Fundamental Principle of Addition • Fundamental Principle of Multiplication

1.12	Seating arrangement	• Create suitable seating plan/ draft as per given conditions (Linear/circular) • Locate the position of a person in a seating arrangement	• Linear and circular seating arrangement • Position of a person in a seating arrangement
UNIT – 2 ALGEBRA			
Sets			
2.1	Introduction to sets – definition	• Define set as well-defined collection of objects	• Definition of a Set • Examples and Non-examples of Set
2.2	Representation of sets	• Represent a set in Roster form and Set builder form	• Write elements of a set in Set Builder form and Roster Form • Convert a set given in Roster form into Set builder form and vice-versa
2.3	Types of sets and their notations	• Identify different types of sets on the basis of number of elements in the set • Differentiate between equal set and equivalence set	• Types of Sets: Finite Set, Infinite Set, Empty Set, Singleton Set
2.4	Subsets	• Enlist all subsets of a set • Find number of subsets of a given set • Find number of elements of a power set	• Subset of a given set • Familiarity with terms like Superset, Improper subset, Universal set, Power set
2.5	Intervals	• Express subset of real numbers as intervals	• Open interval, closed interval, semi open interval and semi closed interval
2.6	Venn diagrams	• Apply the concept of Venn diagram to understand the relationship between sets • Solve problems using Venn diagram	• Venn diagrams as the pictorial representation of relationship between sets • Practical Problems based on Venn Diagrams
2.7	Operations on sets	• Perform operations on sets to solve practical problems	• Operations on sets include i) Union of sets ii) Intersection of sets iii) Difference of sets iv) Complement of a set v) De Morgan's Laws
Relations			
2.8	Ordered pairs Cartesian product of two sets	• Explain the significance of specific arrangement of elements in a pair • Write Cartesian product of two sets • Find the number of	• Ordered pair, order of elements in an ordered pair and equality of ordered pairs • Cartesian product of two non-empty sets

CLASS- XI

Sl. No.	Contents	Learning Outcomes: Students will be able to	Notes / Explanation
UNIT – 1 NUMBERS, QUANTIFICATION AND NUMERICAL APPLICATIONS			
Numbers & Quantification			
1.2	Binary Numbers	• Express decimal numbers in binary system • Express binary numbers in decimal system	• Definition of number system (decimal and binary) • Conversion from decimal to binary system and vice - versa
1.4	Indices, Logarithm and Antilogarithm	• Relate indices and logarithm /antilogarithm • Find logarithm and antilogarithms of given number	• Applications of rules of indices • Introduction of logarithm and antilogarithm • Common and Natural logarithm
1.5	Laws and properties of logarithms	• Enlist the laws and properties of logarithms • Apply laws of logarithm	• Fundamental laws of logarithm
1.6	Simple applications of logarithm and antilogarithm	• Use logarithm in different applications	• Express the problem in the form of an equation and apply logarithm/ antilogarithm
Numerical Applications			
1.7	Averages	• Determine average for a given data	• Definition and meaning • Problems on average, weighted average
1.8	Clock	• Evaluate the angular value of a minute • Calculate the angle formed between two hands of clock at given time • Calculate the time for which hands of clock meet	• Number of rotations of minute hand / hour hand of a clock in a day • Number of times minute hand and hour hand coincides in a day
1.9	Calendar	• Determine Odd days in a month/ year/ century • Decode the day for the given date	• Definition of odd days • Odd days in a year/ century. • Day corresponding to a given date
1.10	Time, Work and Distance	• Establish the relationship between work and time • Compare the work done by the individual / group w.r.t. time • Calculate the time taken/ distance covered/ Work done from the given data	• Basic concept of time and work • Problems on time taken / distance covered / work done
1.11	Mensuration	• Solve problems based on surface area and volume of 2D and 3D shapes • Calculate the volume/ surface area for solid formed using two or more shapes	• Comparison between 2D and 3D shapes • Combination of solids • Transforming one solid shape to another

Grade XI (2024-25)

Number of Paper: 1

Total number of Periods: 240 (35 Minutes Each)

Time: 3 Hours

Max Marks: 80

No.	Units	No. of Periods	Marks
I	Numbers, Quantification and Numerical Applications	25	09
II	Algebra	45	15
III	Mathematical Reasoning	15	06
IV	Calculus	35	10
V	Probability	25	08
VI	Descriptive Statistics	35	12
VII	Basics of Financial Mathematics	45	15
VIII	Coordinate Geometry	15	05
Total		240	80
Internal Assessment			20

Applied Mathematics (XI-XII)

(Code-241)

Session- 2024-25

Secondary School Education prepares students to explore future career options after graduating from schools. Mathematics is an important subject that helps students to choose various fields of their choices. Mathematics is widely used in higher studies as an allied subject in the field of Economics, Commerce, Social Sciences and many others. It has been observed that the syllabus of Mathematics in senior secondary grades meant for Science subjects may not be appropriate for the students who wish to pursue Commerce or Social Science-based subjects in university education. By keeping this in mind, one more elective course in the Mathematics syllabus is developed for Senior Secondary classes with an aim to provide students relevant experience in Mathematics that can be used in fields other than Physical Sciences.

This course is designed to develop substantial mathematical skills and methods needed in other subject areas. Topics covered in two years aim to enable students to use mathematical knowledge in the field of business, economic and social sciences. It aims to promote appreciation of mathematical power and simplicity for its countless applications in diverse fields. The course continues to develop mathematical language and symbolism to communicate and relate everyday experiences mathematically. In addition, it reinforces the logical reasoning skills of formulating and validating mathematical arguments, framing examples, finding counterexamples. It encourages students to engage in mathematical investigations and to build connections within mathematical topics and with other disciplines. The course prepares students to use algebraic methods as a means of representation and as a problem-solving tool. It also enables students to interpret two-dimensional geometrical figures using algebra and to further deduce properties of geometrical figures in a coordinate system. The course content will help students to develop a sound understanding of descriptive and inferential statistics which they can use to describe and analyze a given set of data and to further make meaningful inferences out of it. Data based case studies from the field of business, economics, psychology, education, biology and census data will be used to appreciate the power of data in contemporary society.

It is expected that the subject is taught connecting concepts to the applications in various fields. The objectives of the course areas are as follows:

Objectives:

a) To develop an understanding of basic mathematical and statistical tools and their applications in the field of commerce (business/ finance/economics) and social sciences.
b) To model real-world experiences/problems into mathematical expressions using numerical/algebraic/graphical representation.
c) To make sense of the data by organizing, representing, interpreting, analysing, and making meaningful inferences from real-world situations.
d) To develop logical reasoning skills and apply the same in simple problem-solving.
e) To reinforce mathematical communication by formulating conjectures, validating logical arguments and testing hypothesis.
f) To make connections between Mathematics and other disciplines.

ECONOMICS (Code No. 030)
(2024-25)

Rationale

Economics is one of the social sciences, which has great influence on every human being. As economic life and the economy go through changes, the need to ground education in children's own experience becomes essential. While doing so, it is imperative to provide them opportunities to acquire analytical skills to observe and understand the economic realities.

At senior 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 learners 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:

- Understanding of some basic economic concepts and development of economic reasoning which the learners can apply in their day-to-day life as citizens, workers and consumers.
- Realisation of learners' role in nation building and sensitivity to the economic issues that the nation is facing today.
- Equipment with basic tools of economics and statistics to analyse economic issues. This is pertinent for even those who may not pursue this course beyond senior secondary stage.
- Development of understanding that there can be more than one view on any economic issue and necessary skills to argue logically with reasoning.

ECONOMICS (030)
CLASS – XI (2024-25)

Theory: 80 Marks **3 Hours**
Project: 20 Marks

Units		Marks	Periods
Part A	**Statistics for Economics**		
	Introduction	15	10
	Collection, Organisation and Presentation of Data		30
	Statistical Tools and Interpretation	25	50
		40	
Part B	**Introductory Microeconomics**		
	Introduction	04	10
	Consumer's Equilibrium and Demand	14	40
	Producer Behaviour and Supply	14	35
	Forms of Market and Price Determination under perfect competition with simple applications	08	25
		40	
			200
Part C	**Project Work**	**20**	**20**

Part A: Statistics for Economics

In this course, the learners are expected to acquire skills in collection, organisation and presentation of quantitative and qualitative information pertaining to various simple economic aspects systematically. It also intends to provide some basic statistical tools to analyse, and interpret any economic information and draw appropriate inferences. In this process, the learners are also expected to understand the behaviour of various economic data.

Unit 1: Introduction **10 Periods**

What is Economics?

Meaning, scope, functions and importance of statistics in Economics

Unit 2: Collection, Organisation and Presentation of data **30 Periods**

Collection of data - sources of data - primary and secondary; how basic data is collected with concepts of Sampling; methods of collecting data; some important sources of secondary data: Census of India and National Sample Survey Organisation.

Organisation of Data: Meaning and types of variables; Frequency Distribution.

Presentation of Data: Tabular Presentation and Diagrammatic Presentation of Data: (i) Geometric forms (bar diagrams and pie diagrams), (ii) Frequency diagrams (histogram, polygon and Ogive) and (iii) Arithmetic line graphs (time series graph).

Unit 3: Statistical Tools and Interpretation **50 Periods**

For all the numerical problems and solutions, the appropriate economic interpretation may be attempted. This means, the students need to solve the problems and provide interpretation for the results derived.

Measures of Central Tendency- Arithmetic mean, Median and Mode

Correlation – meaning and properties, scatter diagram; measures of correlation - Karl Pearson's method (two variables ungrouped data) Spearman's rank correlation (Non-Repeated Ranks and Repeated Ranks).

Introduction to Index Numbers - meaning, types - Wholesale Price Index, Consumer Price Index and index of industrial production, uses of index numbers; Inflation and Index Numbers, Simple Aggregative Method.

Part B: Introductory Microeconomics

Unit 4: Introduction **10 Periods**

Meaning of microeconomics and macroeconomics; positive and normative economics

What is an economy? Central problems of an economy: what, how and for whom to produce; concepts of Production Possibility Frontier and Opportunity Cost.

Unit 5: Consumer's Equilibrium and Demand **40 Periods**

Consumer's equilibrium - meaning of Utility, Marginal Utility, Law of Diminishing Marginal Utility, conditions of consumer's equilibrium using marginal utility analysis.

Indifference curve analysis of consumer's equilibrium-the consumer's budget (budget set and budget line), preferences of the consumer (indifference curve, indifference map) and conditions of consumer's equilibrium.

Demand, market demand, determinants of demand, demand schedule, demand curve and its slope, movement along and shifts in the demand curve; price elasticity of demand - factors affecting price elasticity of demand; measurement of price elasticity of demand – percentage-change method and total expenditure method.

Unit 6: Producer Behaviour and Supply **35 Periods**

Meaning of Production Function – Short-Run and Long-Run

Total Product, Average Product and Marginal Product.

Returns to a Factor

Cost – Short run costs - Total Cost, Total Fixed Cost, Total Variable Cost; Average Cost; Average Fixed Cost, Average Variable Cost and Marginal Cost - meaning and their relationships.

Revenue – Total Revenue, Average Revenue and Marginal Revenue - meaning and their relationship.

Producer's Equilibrium - meaning and its conditions in terms of Marginal Revenue-Marginal Cost.

Supply, market supply, determinants of supply, supply schedule, supply curve and its slope, movements along and shifts in supply curve, price elasticity of supply; measurement of price elasticity of supply - percentage-change method.

Unit 7: Perfect Competition - Price Determination and simple applications.

25 Periods

Perfect competition - Features; Determination of market equilibrium and effects of shifts in demand and supply. (Short Run Only)

Simple Applications of Demand and Supply: Price ceiling, Price floor.

Part C: Project in Economics 20 Periods

Guidelines as given in Class XII curriculum

Suggested Question Paper Design
Economics (Code No. 030)
Class XI (2024-25)
March 2025 Examination

Marks: 80 **Duration: 3 hrs.**

SN	Typology of Questions	Marks	Percentage
1	**Remembering and Understanding**: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	44	55%
2	**Applying**: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	18	22.5%
3	**Analysing, Evaluating and Creating:** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	18	22.5%
	Total	**80**	**100%**

ECONOMICS
CLASS - XII (2024-25)

Theory: 80 Marks **3 Hours**
Project: 20 Marks

Units		Marks	Periods
Part A	**Introductory Macroeconomics**		
	National Income and Related Aggregates	10	30
	Money and Banking	06	15
	Determination of Income and Employment	12	30
	Government Budget and the Economy	06	17
	Balance of Payments	06	18
		40	
Part B	**Indian Economic Development**		
	Development Experience (1947-90) and Economic Reforms since 1991	12	28
	Current Challenges facing Indian Economy	20	50
	Development Experience of India – A Comparison with Neighbours	08	12
	Theory Paper (40+40 = 80 Marks)	**40**	
			200
Part C	**Project Work**	**20**	**20**

Part A: Introductory Macroeconomics

Unit 1: National Income and Related Aggregates **30 Periods**

What is Macroeconomics?

Basic concepts in macroeconomics: consumption goods, capital goods, final goods, intermediate goods; stocks and flows; gross investment and depreciation.

Circular flow of income (two sector model); Methods of calculating National Income - Value Added or Product method, Expenditure method, Income method.

Aggregates related to National Income:

Gross National Product (GNP), Net National Product (NNP), Gross Domestic Product (GDP) and Net Domestic Product (NDP) - at market price, at factor cost; Real and Nominal GDP

GDP Deflator, GDP and Welfare

Unit 2: Money and Banking **15 Periods**

Money – meaning and functions, supply of money - Currency held by the public and net demand deposits held by commercial banks.

Money creation by the commercial banking system.

Central bank and its functions (example of the Reserve Bank of India): Bank of issue, Govt. Bank, Banker's Bank, Control of Credit through Bank Rate, Cash Reserve Ratio (CRR), Statutory Liquidity Ratio (SLR), Repo Rate and Reverse Repo Rate, Open Market Operations, Margin requirement.

Unit 3: Determination of Income and Employment **30 Periods**

Aggregate demand and its components.

Propensity to consume and propensity to save (average and marginal).

Short-run equilibrium output; investment multiplier and its mechanism.

Meaning of full employment and involuntary unemployment.

Problems of excess demand and deficient demand; measures to correct them - changes in government spending, taxes and money supply.

Unit 4: Government Budget and the Economy **17 Periods**

Government budget - meaning, objectives and components.

Classification of receipts - revenue receipts and capital receipts;

Classification of expenditure – revenue expenditure and capital expenditure.

Balanced, Surplus and Deficit Budget – measures of government deficit.

Unit 5: Balance of Payments **18 Periods**

Balance of payments account - meaning and components;

Balance of payments – Surplus and Deficit

Foreign exchange rate - meaning of fixed and flexible rates and managed floating.

Determination of exchange rate in a free market, Merits and demerits of flexible and fixed exchange rate.

Managed Floating exchange rate system

Part B: Indian Economic Development

Unit 6: Development Experience (1947-90) and Economic Reforms since 1991:

28 Periods

A brief introduction of the state of Indian economy on the eve of independence.

Indian economic system and common goals of Five Year Plans.

Main features, problems and policies of agriculture (institutional aspects and new agricultural strategy), industry (IPR 1956; SSI – role & importance) and foreign trade.

Economic Reforms since 1991:

Features and appraisals of liberalisation, globalisation and privatisation (LPG policy); Concepts of demonetization and GST

Unit 7: Current challenges facing Indian Economy **60 Periods**

Human Capital Formation: How people become resource; Role of human capital in economic development; Growth of Education Sector in India

Rural development: Key issues - credit and marketing - role of cooperatives; agricultural diversification; alternative farming - organic farming

Employment: Growth and changes in work force participation rate in formal and informal sectors; problems and policies

Sustainable Economic Development: Meaning, Effects of Economic Development on Resources and Environment, including global warming

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

A comparison with neighbours

India and Pakistan

India and China

Issues: economic growth, population, sectoral development and other Human Development Indicators

Part C: Project in Economics **20 Periods**

Prescribed Books:

1. Statistics for Economics, NCERT
2. Indian Economic Development, NCERT
3. Introductory Microeconomics, NCERT
4. Macroeconomics, NCERT
5. Supplementary Reading Material in Economics, CBSE

Note: The above publications are also available in Hindi Medium.

Suggested Question Paper Design
Economics (Code No. 030)
Class XII (2024-25)
March 2025 Examination

Marks: 80 **Duration: 3 hrs.**

SN	Typology of Questions	Marks	Percentage
1	**Remembering and Understanding**: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	44	55%
2	**Applying**: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	18	22.5%
3	**Analysing, Evaluating and Creating:** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	18	22.5%
	Total	**80**	**100%**

Guidelines for Project Work in Economics (Class XI and XII)

The **objectives** of the project work are to enable learners to:

- probe deeper into theoretical concepts learnt in classes XI and XII
- analyse and evaluate real world economic scenarios using theoretical constructs and arguments
- demonstrate the learning of economic theory
- follow up aspects of economics in which learners have interest
- develop the communication skills to argue logically

The **expectations** of the project work are that:

- learners will complete only **ONE** project in each academic session
- project should be of 3,500-4,000 words (excluding diagrams & graphs), preferably hand-written
- it will be an independent, self-directed piece of study

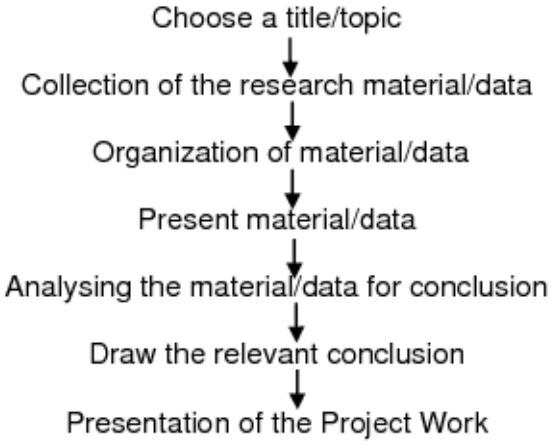
Role of the teacher:

The teacher plays a critical role in developing thinking skills of the learners. A teacher should:

- help each learner select the topic based on recently published extracts from the news media, government policies, RBI bulletin, NITI Aayog reports, IMF/World Bank reports etc., after detailed discussions and deliberations of the topic
- play the role of a facilitator and supervisor to monitor the project work of the learner through periodic discussions
- guide the research work in terms of sources for the relevant data
- educate learner about plagiarism and the importance of quoting the source of the information to ensure authenticity of research work
- prepare the learner for the presentation of the project work
- arrange a presentation of the project file

Scope of the project:

Learners may work upon the following lines as a suggested flow chart:



Expected Checklist:

- Introduction of topic/title
- Identifying the causes, consequences and/or remedies
- Various stakeholders and effect on each of them
- Advantages and disadvantages of situations or issues identified
- Short-term and long-term implications of economic strategies suggested in the course of research
- Validity, reliability, appropriateness and relevance of data used for research work and for presentation in the project file
- Presentation and writing that is succinct and coherent in project file
- Citation of the materials referred to, in the file in footnotes, resources section, bibliography etc.

Mode of presentation/submission of the Project:

At the end of the stipulated term, each learner will present the research work in the Project File to the External and Internal examiner. **The questions should be asked from the Research Work/ Project File of the learner. The Internal Examiner should ensure that the study submitted by the learner is his/her own original work.** In case of any doubt, authenticity should be checked and verified.

Marking Scheme:

Marks are suggested to be given as –

S. No.	Heading	Marks Allotted
1.	Relevance of the topic	3
2.	Knowledge Content/Research Work	6
3.	Presentation Technique	3
4.	Viva-voce	8
	Total	20 Marks

Suggestive List of Projects:

Class XI	
• Effect on PPC due to various government policies	• Invisible Hand (Adam Smith)
• Opportunity Cost as an Economic Tool (taking real life situations)	• Effect of Price Change on a Substitute Good (taking prices from real life visiting local market)
• Effect on Equilibrium Prices in Local Market (taking real life situation or recent news)	• Effect of Price Change on a Complementary Good (taking prices from real life visiting local market)
• Solar Energy, a Cost-Effective Comparison with Conventional Energy Sources	• Bumper Production- Boon or Bane for the Farmer
• Any other newspaper article and its evaluation on basis of economic principles	• **Any other topic**

Class XII	
• Micro and Small Scale Industries	• Food Supply Channel in India
• Contemporary Employment situation in India	• Disinvestment policy of the government
• Goods and Services Tax Act and its Impact on GDP	• Health Expenditure (of any state)
• Human Development Index	• Inclusive Growth Strategy
• Self-help group	• Trends in Credit availability in India
• Monetary Policy Committee and its functions	• Role of RBI in Control of Credit
• Government Budget & its Components	• Trends in budgetary condition of India
• Exchange Rate determination – Methods and Techniques	• Currency War – reasons and repercussions
• Livestock – Backbone of Rural India	• Alternate fuel – types and importance
• Sarva Shiksha Abhiyan – Cost Ratio Benefits	• Golden Quadrilateral- Cost ratio benefit
• Minimum Support Prices	• Relation between Stock Price Index and Economic Health of a Nation
• Waste Management in India – Need of the hour	• Minimum Wage Rate – Approach and Application
• Digital India- Step towards the future	• Rain Water Harvesting – A solution to water crisis
• Vertical Farming – An alternate way	• Silk Route- Revival of the past
• Make in India – The way ahead	• Bumper Production- Boon or Bane for the farmer
• Rise of Concrete Jungle- Trend Analysis	• Organic Farming – Back to the Nature
• Aatmanirbhar Bharat	• e-Rupee (e- ₹)
• Sri Lanka's Economic Crisis	• Sustainable Development Goals (SDG's)
• Environmental Crisis	• Comparative Study of Economies (Maximum three economies)
• New Education Policy (NEP) 2020: A Promise for a New Education System	• G-20: Inclusive and Action Oriented
• Amrit Kaal: Empowered and Inclusive Economy	• Cashless Economy
• Any other newspaper article and its evaluation on basis of economic principles	• **Any other topic**

ACCOUNTANCY (Code No. 055)

Rationale

The course in accountancy is introduced at plus two stage of senior second of school education, as the formal commerce education is provided after ten years of schooling. With the fast changing economic scenario, accounting as a source of financial information has carved out a place for itself at the senior secondary stage. Its syllabus content provide students a firm foundation in basic accounting concepts and methodology and also acquaint them with the changes taking place in the preparation and presentation of financial statements in accordance to the applicable accounting standards and the Companies Act 2013.

The course in accounting put emphasis on developing basic understanding about accounting as an information system. The emphasis in Class XI is placed on basic concepts and process of accounting leading to the preparation of accounts for a sole proprietorship firm. The students are also familiarized with basic calculations of Goods and Services Tax (GST) in recording the business transactions. The accounting treatment of GST is confined to the syllabus of class XI.

The increased role of ICT in all walks of life cannot be overemphasized and is becoming an integral part of business operations. The learners of accounting are introduced to Computerized Accounting System at class XI and XII. Computerized Accounting System is a compulsory component which is to be studied by all students of commerce in class XI; whereas in class XII it is offered as an optional subject to Company Accounts and Analysis of Financial Statements. This course is developed to impart skills for designing need based accounting database for maintaining book of accounts.

The complete course of Accountancy at the senior secondary stage introduces the learners to the world of business and emphasize on strengthening the fundamentals of the subject.

Objectives:

1. To familiarize students with new and emerging areas in the preparation and presentation of financial statements.
2. To acquaint students with basic accounting concepts and accounting standards.
3. To develop the skills of designing need based accounting database.
4. To appreciate the role of ICT in business operations.
5. To develop an understanding about recording of business transactions and preparation of financial statements.
6. To enable students with accounting for Not-for-Profit organizations, accounting for Partnership Firms and company accounts.

Accountancy (Code No.055)

Course Structure

Class-XI (2024-25)

Theory: 80 Marks **3 Hours**

Project: 20 Marks

Units		Periods	Marks
Part A: Financial Accounting-1			
	Unit-1: Theoretical Framework	**25**	**12**
	Unit-2: Accounting Process	**115**	**44**
Part B: Financial Accounting-II			
	Unit-3: Financial Statements of Sole Proprietorship	**60**	**24**
Part C: Project Work		**20**	**20**

PART A: FINANCIAL ACCOUNTING - I

Unit-1: Theoretical Frame Work

Units/Topics	Learning Outcomes
Introduction to Accounting • Accounting- concept, meaning, as a source of information, objectives, advantages and limitations, types of accounting information; users of accounting information and their needs. Qualitative Characteristics of Accounting Information. Role of Accounting in Business. • Basic Accounting Terms- Entity, Business Transaction, Capital, Drawings. Liabilities (Non Current and Current). Assets (Non Current, Current); Expenditure (Capital and Revenue), Expense, Revenue, Income, Profit, Gain, Loss, Purchase, Sales, Goods, Stock, Debtor, Creditor, Voucher, Discount (Trade discount and Cash Discount) **Theory Base of Accounting** • Fundamental accounting assumptions: GAAP: Concept • Basic Accounting Concept : Business Entity,	**After going through this Unit, the students will be able to:** • describe the meaning, significance, objectives, advantages and limitations of accounting in the modern economic environment with varied types of business and non-business economic entities. • identify / recognise the individual(s) and entities that use accounting information for serving their needs of decision making. • explain the various terms used in accounting and differentiate between different related terms like current and non-current, capital and revenue. • give examples of terms like business transaction, liabilities, assets, expenditure and purchases. • explain that sales/purchases include both cash and credit sales/purchases relating to the accounting year.

Money Measurement, Going Concern, Accounting Period, Cost Concept, Dual Aspect, Revenue Recognition, Matching, Full Disclosure, Consistency, Conservatism, • Materiality and Objectivity • System of Accounting. Basis of Accounting: cash basis and accrual basis • Accounting Standards: Applicability of Accounting Standards (AS) and Indian Accounting Standards (IndAS) • Goods and Services Tax (GST): Characteristics and Advantages.	• differentiate among income, profits and gains. • state the meaning of fundamental accounting assumptions and their relevance in accounting. • describe the meaning of accounting assumptions and the situation in which an assumption is applied during the accounting process. • explain the meaning, applicability, objectives, advantages and limitations of accounting standards. • appreciate that various accounting standards developed nationally and globally are in practice for bringing parity in the accounting treatment of different items. • acknowledge the fact that recording of accounting transactions follows double entry system. • explain the bases of recording accounting transaction and to appreciate that accrual basis is a better basis for depicting the correct financial position of an enterprise. • Explain the meaning, advantages and characteristic of GST.

Unit-2: Accounting Process

Units/Topics	Learning Outcomes
Recording of Business Transactions • Voucher and Transactions: Source documents and Vouchers, Preparation of Vouchers, Accounting Equation Approach: Meaning and Analysis, Rules of Debit and Credit. • Recording of Transactions: Books of Original Entry- Journal • Special Purpose books: • Cash Book: Simple, cash book with bank column and petty cashbook	**After going through this Unit, the students will be able to:** • explain the concept of accounting equation and appreciate that every transaction affects either both the sides of the equation or a positive effect on one item and a negative effect on another item on the same side of accounting equation. • explain the effect of a transaction (increase or decrease) on the assets, liabilities, capital, revenue and expenses.

• Purchases book • Sales book • Purchases return book • Sales return book • Journal proper **Note: Including trade discount, freight and cartage expenses for simple GST calculation.** • Ledger: Format, Posting from journal and subsidiary books, Balancing of accounts **Bank Reconciliation Statement:** • Need and preparation, Bank Reconciliation Statement **Depreciation, Provisions and Reserves** • Depreciation: Meaning, Features, Need, Causes, factors • Other similar terms: Depletion and Amortisation • Methods of Depreciation: i. Straight Line Method (SLM) ii. Written Down Value Method (WDV) **Note: Excluding change of method** • Difference between SLM and WDV; Advantages of SLM and WDV • Method of recoding depreciation i. Charging to asset account ii. Creating provision for depreciation/accumulated depreciation account • Treatment of disposal of asset • Provisions, Reserves, Difference Between Provisions and Reserves. • Types of Reserves: i. Revenue reserve ii. Capital reserve iii. General reserve iv. Specific reserve v. Secret Reserve • Difference between capital and revenue reserve	• appreciate that on the basis of source documents, accounting vouchers are prepared for recording transaction in the books of accounts. • develop the understanding of recording of transactions in journal and the skill of calculating GST. • explain the purpose of maintaining a Cash Book and develop the skill of preparing the format of different types of cash books and the method of recording cash transactions in Cash book. • describe the method of recording transactions other than cash transactions as per their nature in different subsidiary books . • appreciate that at times bank balance as indicated by cash book is different from the bank balance as shown by the pass book / bank statement and to reconcile both the balances, bank reconciliation statement is prepared. • develop understanding of preparing bank reconciliation statement. • appreciate that for ascertaining the position of individual accounts, transactions are posted from subsidiary books and journal proper into the concerned accounts in the ledger and develop the skill of ledger posting. • explain the necessity of providing depreciation and develop the skill of using different methods for computing depreciation. • understand the accounting treatment of providing depreciation directly to the concerned asset account or by creating provision for depreciation account. • appreciate the method of asset disposal through the concerned asset account or by preparing asset disposal account. • appreciate the need for creating reserves and

Trial balance and Rectification of Errors • Trial balance: objectives, meaning and preparation **(Scope:** Trial balance with balance method only) • Errors: classification-errors of omission, commission, principles, and compensating; their effect on Trial Balance. • Detection and rectification of errors; (i) Errors which do not affect trial balance (ii) Errors which affect trial balance • preparation of suspense account.	also making provisions for events which may belong to the current year but may happen in next year. • appreciate the difference between reserve and reserve fund. • state the need and objectives of preparing trial balance and develop the skill of preparing trial balance. • appreciate that errors may be committed during the process of accounting. • understand the meaning of different types of errors and their effect on trial balance. • develop the skill of identification and location of errors and their rectification and preparation of suspense account.

Part B: Financial Accounting - II

Unit 3: Financial Statements of Sole Proprietorship

Units/Topics	Learning Outcomes
Financial Statements Meaning, objectives and importance; Revenue and Capital Receipts; Revenue and Capital Expenditure; Deferred Revenue expenditure. Opening journal entry. Trading and Profit and Loss Account: Gross Profit, Operating profit and Net profit. Preparation. Balance Sheet: need, grouping and marshalling of assets and liabilities. Preparation. Adjustments in preparation of financial statements with respect to closing stock, outstanding expenses, prepaid expenses, accrued income, income received in advance, depreciation, bad debts, provision for doubtful debts, provision for discount on debtors, Abnormal loss, Goods taken for personal use/staff welfare, interest on capital and managers commission. Preparation of Trading and Profit and Loss account and Balance Sheet of a sole proprietorship with adjustments.	**After going through this Unit, the students will be able to:** • state the meaning of financial statements the • purpose of preparing financial statements. • state the meaning of gross profit, operating profit and net profit and develop the skill of preparing trading and profit and loss account. • explain the need for preparing balance sheet. • understand the technique of grouping and marshalling of assets and liabilities. • appreciate that there may be certain items other than those shown in trial balance which may need adjustments while preparing financial statements. • develop the understanding and skill to do adjustments for items and their presentation in financial statements like depreciation, closing stock, provisions, abnormal loss etc. • develop the skill of preparation of trading and profit and loss account and balance sheet.

Incomplete Records Features, reasons and limitations. Ascertainment of Profit/Loss by Statement of Affairs method. (excluding conversion method)	

Part C: Project Work (Any One)

1. Collection of source documents, preparation of vouchers, recording of transactions with the help of vouchers.

2. Preparation of Bank Reconciliation Statement with the given cash book and the pass book with twenty to twenty-five transactions.

3. Comprehensive project of any sole proprietorship business. This may state with journal entries and their ledgering, preparation of Trial balance. Trading and Profit and Loss Account and Balance Sheet. Expenses, incomes and profit (loss), assets and liabilities are to be depicted using pie chart / bar diagram. This may include simple GST related transactions.

PROJECT WORK

It is suggested to undertake this project after completing the unit on preparation of financial statements. The student(s) will be allowed to select any business of their choice or develop the transaction of imaginary business. The project is to run through the chapters and make the project an interesting process. The amounts should emerge as more realistic and closer to reality.

Specific Guidelines for Teachers

Give a list of options to the students to select a business form. You can add to the given list:

1. A beauty parlour
2. Men's saloon
3. A tailoring shop
4. A canteen
5. A cake shop
6. A confectionery shop
7. A chocolate shop
8. A dry cleaner
9. A stationery shop
10. Men's wear
11. Ladies wear
12. Kiddies wear
13. A Saree shop
14. Artificial jewellery shop
15. A small restaurant
16. A sweet shop
17. A grocery shop
18. A shoe shop
19. A coffee shop
20. A music shop
21. A juice shop
22. A school canteen
23. An ice cream parlour
24. A sandwich shop
25. A flower shop

After selection, advise the student(s) to visit a shop in the locality (this will help them to settle on a realistic amounts different items. The student(s) would be able to see the things as they need to invest in furniture, decor, lights, machines, computers etc.

A suggested list of different item is given below.

1. Rent
2. Advance rent [approximately three months]
3. Electricity deposit
4. Electricity bill
5. Electricity fitting
6. Water bill
7. Water connection security deposit
8. Water fittings
9. Telephone bill
10. Telephone security deposit
11. Telephone instrument
12. Furniture
13. Computers
14. Internet connection
15. Stationery
16. Advertisements
17. Glow sign
18. Rates and Taxes
19. Wages and Salary
20. Newspaper and magazines
21. Petty expenses
22. Tea expenses
23. Packaging expenses
24. Transport
25. Delivery cycle or a vehicle purchased
26. Registration
27. Insurance
28. Auditors fee
29. Repairs & Maintenance
30. Depreciations
31. Air conditioners
32. Fans and lights
33. Interior decorations
34. Refrigerators
35. Purchase and sales

At this stage, performas of bulk of originality and ledger may be provided to the students and they may be asked to complete the same.

In the next step the students are expected to prepare the trial balance and the financial statements.

Suggested Question Paper Design
Accountancy (Code No. 055)
Class XI (2024-25)

Theory: 80 Marks **3 hrs.**
Project: 20 Marks

S N	Typology of Questions	Marks	Percentage
1	**Remembering and Understanding**: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	44	55%
3	**Applying**: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	19	23.75%
4	**Analysing, Evaluating and Creating:** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	17	21.25%
	TOTAL	**80**	**100%**

Accountancy (Code No. 055)
Class-XII (2024-25)

Theory: 80 Marks **3 Hours**

Project: 20 Marks

Units			Periods	Marks
Part A	**Accounting for Partnership Firms and Companies**			
	Unit 1. Accounting for Partnership Firms		105	36
	Unit 2. Accounting for Companies		45	24
			150	**60**
Part B	**Financial Statement Analysis**			
	Unit 3. Analysis of Financial Statements		30	12
	Unit 4. Cash Flow Statement		20	8
			50	**20**
Part C	**Project Work**		20	20
	Project work will include:			
	Project File	12 Marks		
	Viva Voce	8 Marks		
Or				
Part B	**Computerized Accounting**			
	Unit 4. Computerized Accounting		50	20
Part C	**Practical Work**		20	20
	Practical work will include:			
	Practical File 12 Marks			
	Viva Voce 8 Marks			

Part A: Accounting for Partnership Firms and Companies

Unit 1: Accounting for Partnership Firms

Units/Topics	Learning Outcomes
• Partnership: features, Partnership Deed. • Provisions of the Indian Partnership Act 1932 in the absence of partnership deed. • Fixed v/s fluctuating capital accounts. Preparation of Profit and Loss Appropriation account- division of profit among partners, guarantee of profits. • Past adjustments (relating to interest on capital, interest on drawing, salary and profit sharing ratio). • Goodwill: meaning, nature, factors affecting and methods of valuation - average profit, super profit and capitalization. **Note:** Interest on partner's loan is to be treated as a charge against profits. Goodwill: meaning, factors affecting, need for valuation, methods for calculation (average profits, super profits and capitalization), adjusted through partners capital/ current account. **Accounting for Partnership firms - Reconstitution and Dissolution.** • **Change in the Profit Sharing Ratio** among the existing partners - sacrificing ratio, gaining ratio, accounting for revaluation of assets and reassessment of liabilities and treatment of reserves, accumulated profits and losses. Preparation of revaluation account and balance sheet. • **Admission of a partner** - effect of admission of a partner on change in the profit sharing ratio, treatment of goodwill (as per AS 26), treatment for revaluation of assets and re-assessment of liabilities, treatment of reserves, accumulated profits and losses,	**After going through this Unit, the students will be able to:** • state the meaning of partnership, partnership firm and partnership deed. • describe the characteristic features of partnership and the contents of partnership deed. • discuss the significance of provision of Partnership Act in the absence of partnership deed. • differentiate between fixed and fluctuating capital, outline the process and develop the understanding and skill of preparation of Profit and Loss Appropriation Account. • develop the understanding and skill of preparation profit and loss appropriation account involving guarantee of profits. • develop the understanding and skill of making past adjustments. • state the meaning, nature and factors affecting goodwill • develop the understanding and skill of valuation of goodwill using different methods. • state the meaning of sacrificing ratio, gaining ratio and the change in profit sharing ratio among existing partners. • develop the understanding of accounting treatment of revaluation assets and reassessment of liabilities and treatment of reserves and accumulated profits by preparing revaluation account and balance sheet. • explain the effect of change in profit sharing ratio on admission of a new partner. • develop the understanding and skill of

adjustment of capital accounts and preparation of capital, current account and balance sheet. • **Retirement and death of a partner:** effect of retirement / death of a partner on change in profit sharing ratio, treatment of goodwill (as per AS 26), treatment for revaluation of assets and reassessment of liabilities, adjustment of accumulated profits, losses and reserves, adjustment of capital accounts and preparation of capital, current account and balance sheet. Preparation of loan account of the retiring partner. • Calculation of deceased partner's share of profit till the date of death. Preparation of deceased partner's capital account and his executor's account. • **Dissolution of a partnership firm:** meaning of dissolution of partnership and partnership firm, types of dissolution of a firm. Settlement of accounts - preparation of realization account, and other related accounts: capital accounts of partners and cash/bank a/c (excluding piecemeal distribution, sale to a company and insolvency of partner(s)). **Note:** (i) If the realized value of tangible assets is not given it should be considered as realized at book value itself. (ii) If the realized value of intangible assets is not given it should be considered as nil (zero value). (ii) In case, the realization expenses are borne by a partner, clear indication should be given regarding the payment thereof.	treatment of goodwill as per AS-26, treatment of revaluation of assets and re-assessment of liabilities, treatment of reserves and accumulated profits, adjustment of capital accounts and preparation of capital, current account and balance sheet of the new firm. • explain the effect of retirement / death of a partner on change in profit sharing ratio. • develop the understanding of accounting treatment of goodwill, revaluation of assets and re-assessment of liabilities and adjustment of accumulated profits, losses and reserves on retirement / death of a partner and capital adjustment. • develop the skill of calculation of deceased partner's share till the time of his death and prepare deceased partner's and executor's account. • discuss the preparation of the capital accounts of the remaining partners and the balance sheet of the firm after retirement / death of a partner. • understand the situations under which a partnership firm can be dissolved. • develop the understanding of preparation of realisation account and other related accounts.

Unit-3 Accounting for Companies

Units/Topics	Learning Outcomes
Accounting for Share Capital • Features and types of companies. • Share and share capital: nature and types.	**After going through this Unit, the students will be able to:** • state the meaning of share and share capital

• Accounting for share capital: issue and allotment of equity and preferences shares. Public subscription of shares - over subscription and under subscription of shares; issue at par and at premium, calls in advance and arrears (excluding interest), issue of shares for consideration other than cash. • Concept of Private Placement and Employee Stock Option Plan (ESOP), Sweat Equity. • Accounting treatment of forfeiture and re-issue of shares. • Disclosure of share capital in the Balance Sheet of a company. **Accounting for Debentures** • Debentures: Meaning, types, Issue of debentures at par, at a premium and at a discount. Issue of debentures for consideration other than cash; Issue of debentures with terms of redemption; debentures as collateral security-concept, interest on debentures (concept of TDS is excluded). Writing off discount / loss on issue of debentures. Note: Discount or loss on issue of debentures to be written off in the year debentures are allotted from Security Premium Reserve (if it exists) and then from Statement of Profit and Loss as Financial Cost (AS 16)	and differentiate between equity shares and preference shares and different types of share capital. • understand the meaning of private placement of shares and Employee Stock Option Plan. • explain the accounting treatment of share capital transactions regarding issue of shares. • develop the understanding of accounting treatment of forfeiture and re-issue of forfeited shares. • describe the presentation of share capital in the balance sheet of the company as per schedule III part I of the Companies Act 2013. • explain the accounting treatment of different categories of transactions related to issue of debentures. • develop the understanding and skill of writing of discount / loss on issue of debentures. • understand the concept of collateral security and its presentation in balance sheet. • develop the skill of calculating interest on debentures and its accounting treatment. • state the meaning of redemption of debentures.

Part B: Financial Statement Analysis

Unit 4: Analysis of Financial Statements

Units/Topics	Learning Outcomes
Financial statements of a Company: Meaning, Nature, Uses and importance of financial Statement. Statement of Profit and Loss and Balance Sheet in	**After going through this Unit, the students will be able to:** • develop the understanding of major headings and sub-headings (as per Schedule III to the

prescribed form with major headings and sub headings (as per Schedule III to the Companies Act, 2013) **Note:** Exceptional items, extraordinary items and profit (loss) from discontinued operations are excluded. • **Financial Statement Analysis: Meaning, Significance** Objectives, importance and limitations. • **Tools for Financial Statement Analysis:** Comparative statements, common size statements, Ratio analysis, Cash flow analysis. • **Accounting Ratios:** Meaning, Objectives, Advantages, classification and computation. • **Liquidity Ratios:** Current ratio and Quick ratio. • **Solvency Ratios:** Debt to Equity Ratio, Total Asset to Debt Ratio, Proprietary Ratio and Interest Coverage Ratio. Debt to Capital Employed Ratio. • **Activity Ratios:** Inventory Turnover Ratio, Trade Receivables Turnover Ratio, Trade Payables Turnover Ratio, Fixed Asset Turnover Ratio, Net Asset Turnover Ratio and Working Capital Turnover Ratio. • **Profitability Ratios:** Gross Profit Ratio, Operating Ratio, Operating Profit Ratio, Net Profit Ratio and Return on Investment.	Companies Act, 2013) of balance sheet as per the prescribed norms / formats. • state the meaning, objectives and limitations of financial statement analysis. • discuss the meaning of different tools of 'financial statements analysis'. • develop the skill of preparation of preparation of comparative and common size statement, understand their uses and difference between the two. • state the meaning, objectives and significance of different types of ratios. • develop the understanding of computation of current ratio and quick ratio. • develop the skill of computation of debt equity ratio, total asset to debt ratio, proprietary ratio and interest coverage ratio. • develop the skill of computation of inventory turnover ratio, trade receivables and trade payables ratio and working capital turnover ratio and others. • develop the skill of computation of gross profit ratio, operating ratio, operating profit ratio, net profit ratio and return on investment.

Note: Net Profit Ratio is to be calculated on the basis of profit before and after tax.

Unit 5: Cash Flow Statement

Units/Topics	Learning Outcomes
• Meaning, objectives Benefits, Cash and Cash Equivalents, Classification of Activities and preparation (as per AS 3 (Revised) (Indirect Method only)	**After going through this Unit, the students will be able to:** • state the meaning and objectives of cash flow statement.

Note: **(i)** Adjustments relating to depreciation and amortization, profit or loss on sale of assets including investments, dividend (both final and interim) and tax. **(ii)** Bank overdraft and cash credit to be treated as short term borrowings. **(iii)** Current Investments to be taken as Marketable securities unless otherwise specified.	• develop the understanding of preparation of Cash Flow Statement using indirect method as per AS 3 with given adjustments.

Note: *Previous years' Proposed Dividend to be given effect, as prescribed in AS*-4, Events occurring after the *Balance Sheet date. Current years' Proposed Dividend will be accounted for in the next year after it is declared* by the shareholders.

Project Work

One specific project based on financial statement analysis of a company covering any two aspects from the following:

1. Comparative and common size financial statements
2. Accounting Ratios
3. Segment Reports
4. Cash Flow Statements

OR

Part B: Computerised Accounting

Unit 4: Computerised Accounting

Overview of Computerised Accounting System

- Introduction: Application in Accounting.
- Features of Computerised Accounting System.
- Structure of CAS.
- Software Packages: Generic; Specific; Tailored.

Accounting Application of Electronic Spreadsheet.

- Concept of electronic spreadsheet.
- Features offered by electronic spreadsheet.
- Application in generating accounting information - bank reconciliation statement; asset accounting; loan repayment of loan schedule, ratio analysis
- Data representation- graphs, charts and diagrams.

Using Computerized Accounting System.

- Steps in installation of CAS, codification and Hierarchy of account heads, creation of accounts.
- Data: Entry, validation and verification.
- Adjusting entries, preparation of balance sheet, profit and loss account with closing entries and opening entries.
- Need and security features of the system.

Part C: Practical Work

Prescribed Books:

Financial Accounting -I	Class XI	NCERT Publication
Accountancy -II	Class XI	NCERT Publication
Accountancy -I	Class XII	NCERT Publication
Accountancy -II	Class XII	NCERT Publication
Accountancy – Computerised Accounting System	Class XII	NCERT Publication

Suggested Question Paper Design
Accountancy (Code No. 055)
Class XII (2024-25)

Theory: 80 Marks **3 hrs.**
Project: 20 Marks

S N	Typology of Questions	Marks	Percentage
1	**Remembering and Understanding**: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	44	55%
3	**Applying**: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	19	23.75%
4	**Analysing, Evaluating and Creating:** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	17	21.25%
	TOTAL	**80**	**100%**

BUSINESS STUDIES (Code No. 054)

Rationale

The courses in Business Studies and Accountancy are introduced at + 2 stage of Senior Secondary Education as formal commerce education is provided after first ten years of schooling. Therefore, it becomes necessary that instructions in these subjects are given in such a manner that students have a good understanding of the principles and practices bearing in business (trade and industry) as well as their relationship with the society.

Business is a dynamic process that brings together technology, natural resources and human initiative in a constantly changing global environment. To understand the framework in which a business operates, a detailed study of the organisation and management of business processes and its interaction with the environment is required. Globalisation has changed the way organizations transact their business.

Information Technology is becoming a part of business operations in more and more organisations. Computerised systems are fast replacing other systems. E-business and other related concepts are picking up fast which need to be emphasized in the curriculum.

The course in Business Studies prepares students to analyse, manage, evaluate and respond to changes which affect business. It provides a way of looking at and interacting with the business environment. It recognizes the fact that business influences and is influenced by social, political, legal and economic forces.

It allows students to appreciate that business is an integral component of society and develops an understanding of many social and ethical issues.

Therefore, to acquire basic knowledge of the business world, a course in Business Studies would be useful. It also informs students of a range of study and work options and bridges the gap between school and work.

Objectives:

- To inculcate business attitude and develop skills among students to pursue higher education, world of work including self employment.
- To develop students with an understanding of the processes of business and its environment;
- To acquaint students with the dynamic nature and inter-dependent aspects of business;
- To develop an interest in the theory and practice of business, trade and industry;
- To familiarize students with theoretical foundations of the process of organizing and managing the operations of a business firm;
- To help students appreciate the economic and social significance of business activity and the social cost and benefits arising there from;
- To acquaint students with the practice of managing the operations and resources of business;
- To enable students to act more effectively and responsibly as consumers, employers, employees and citizens;

BUSINESS STUDIES (Code No. 054)
CLASS–XI (2024-25)

Theory: 80 Marks **3 Hours**
Project: 20 Marks

Units		Periods	Marks
Part A	**Foundations of Business**		
1	Nature and Purpose of Business	18	16
2	Forms of Business Organisations	24	
3	Public, Private and Global Enterprises	18	14
4	Business Services	18	
5	Emerging Modes of Business	10	10
6	Social Responsibility of Business and Business Ethics	12	
	Total	**100**	**40**
Part B	**Finance and Trade**		
7	Sources of Business Finance	30	20
8	Small Business	16	
9	Internal Trade	30	20
10	International Business	14	
	Total	**90**	**40**
	Project Work (One)	**30**	**20**

Part A: Foundation of Business
Concept includes meaning and features

Unit 1: Evolution and Fundamentals of Business

Content	After going through this unit, the student/ learner would be able to:
History of Trade and Commerce in India: Indigenous Banking System, Rise of Intermediaries, Transport, Trading Communities: Merchant Corporations, Major Trade Centres, Major Imports and Exports, Position of Indian Sub-Continent in the World Economy	• To acquaint the History of Trade and Commerce in India
Business – meaning and characteristics	• Understand the meaning of business with special reference to economic and non-economic activities. • Discuss the characteristics of business.
Business, profession and employment – Concept	• Understand the concept of business, profession and employment. • Differentiate between business, profession and employment.

Objectives of business	• Appreciate the economic and social objectives of business. • Examine the role of profit in business.
Classification of business activities - Industry and Commerce	• Understand the broad categories of business activities- industry and commerce.
Industry-types: primary, secondary, tertiary Meaning and subgroups	• Describe the various types of industries.
Commerce-trade: (types-internal, external; wholesale and retail) and auxiliaries to trade; (banking, insurance, transportation, warehousing, communication, and advertising) – meaning	• Discuss the meaning of commerce, trade and auxiliaries to trade. • Discuss the meaning of different types of trade and auxiliaries to trade. • Examine the role of commerce-trade and auxiliaries to trade.
Business risk-Concept	• Understand the concept of risk as a special characteristic of business. • Examine the nature and causes of business risks.

Unit 2: Forms of Business organizations

Sole Proprietorship-Concept, merits and limitations	• List the different forms of business organizations and understand their meaning. • Identify and explain the concept, merits and limitations of Sole Proprietorship.
Partnership-Concept, types, merits and limitation of partnership, registration of a partnership firm, partnership deed. Types of partners	• Identify and explain the concept, merits and limitations of a Partnership firm. • Understand the types of partnership on the basis of duration and on the basis of liability. • State the need for registration of a partnership firm. • Discuss types of partners –active, sleeping, secret, nominal and partner by estoppel.
Hindu Undivided Family Business: Concept	• Understand the concept of Hindu Undivided Family Business.
Cooperative Societies-Concept, merits, and limitations.	• Identify and explain the concept, merits and limitations of Cooperative Societies. • Understand the concept of consumers, producers, marketing, farmers, credit and housing co-operatives.

Company - Concept, merits and limitations; Types: Private, Public and One Person Company – Concept	• Identify and explain the concept, merits and limitations of private and public companies. • Understand the meaning of one person company. • Distinguish between a private company and a public company.
Formation of company - stages, important documents to be used in formation of a company	• Highlight the stages in the formation of a company. • Discuss the important documents used in the various stages in the formation of a company.
Choice of form of business organization	• Distinguish between the various forms of business organizations. • Explain the factors that influence the choice of a suitable form of business organization.

Unit 3: Public, Private and Global Enterprises

Public sector and private sector enterprises – Concept	• Develop an understanding of Public sector and private sector enterprises
Forms of public sector enterprises: Departmental Undertakings, Statutory Corporations and Government Company	• Identify and explain the features, merits and limitations of different forms of public sector enterprises
Global Enterprises – Feature Joint venture Public private partnership – concept	• Develop an understanding of global enterprises, public private partnership by studying their meaning and features.

Unit 4: Business Services

Business services – meaning and types. Banking: Types of bank accounts - savings, current, recurring, fixed deposit and multiple option deposit account	• Understand the meaning and types of business services. • Discuss the meaning and types of Business service Banking • Develop an understanding of difference types of bank account.
Banking services with particular reference to Bank Draft, Bank Overdraft, Cash credit. E-Banking: meaning, types of digital payments	• Develop an understanding of the different services provided by banks
Insurance – Principles. Types – life, health, fire and marine insurance – concept	• Recall the concept of insurance • Understand Utmost Good Faith, Insurable Interest, Indemnity, Contribution, Doctrine of Subrogation and Causa Proxima as principles of insurance • Discuss the meaning of different

	types of insurance-life, health, fire, marine insurance.
Postal Service - Mail, Registered Post, Parcel, Speed Post, Courier - meaning	• Understand the utility of different telecom services

Unit 5: Emerging Modes of Business

E - business: concept, scope and benefits	• Give the meaning of e-business. • Discuss the scope of e-business. • Appreciate the benefits of e-business • Distinguish e-business from traditional business.

Unit 6: Social Responsibility of Business and Business Ethics

Concept of social responsibility	• State the concept of social responsibility.
Case of social responsibility	• Examine the case for social responsibility.
Responsibility towards owners, investors, consumers, employees, government and community	• Identify the social responsibility towards different interest groups.
Role of business in environment protection	• Appreciate the role of business in environment protection.
Business Ethics - Concept and Elements	• State the concept of business ethics. • Describe the elements of business ethics.

Part B: Finance and Trade

Unit 7: Sources of Business Finance

Concept of business finance	• State the meaning, nature and importance of business finance.
Owners' funds- equity shares, preferences share, retained earnings	• Classify the various sources of funds into owners' funds. • State the meaning of owners' funds.
Borrowed funds: debentures and bonds, loan from financial institution and commercial banks, public deposits, trade credit, Inter Corporate Deposits (ICD)	• State the meaning of borrowed funds. • Discuss the concept of debentures, bonds, loans from financial institutions and commercial banks, Trade credit and inter corporate deposits. • Distinguish between owners' funds and borrowed funds.

Unit 8: Small Business and Enterprises

Entrepreneurship Development (ED): Concept, Characteristics and Need. Process of Entrepreneurship Development: Start-up India Scheme, ways to fund start-up. Intellectual Property Rights and Entrepreneurship	• Understand the concept of Entrepreneurship Development (ED), Intellectual Property Rights
Small scale enterprise as defined by MSMED Act 2006 (Micro, Small and Medium Enterprise Development Act)	• Understand the meaning of small business
Role of small business in India with special reference to rural areas	• Discuss the role of small business in India
Government schemes and agencies for small scale industries: National Small Industries Corporation (NSIC) and District Industrial Centre (DIC) with special reference to rural, backward areas	• Appreciate the various Government schemes and agencies for development of small scale industries. NSIC and DIC with special reference to rural, backward area.

Unit 9: Internal Trade

Internal trade - meaning and types services rendered by a wholesaler and a retailer	• State the meaning and types of internal trade. • Appreciate the services of wholesalers and retailers.
Types of retail-trade-Itinerant and small scale fixed shops retailers	• Explain the different types of retail trade.
Large scale retailers-Departmental stores, chain stores – concept	• Highlight the distinctive features of departmental stores, chain stores and mail order business.
GST (Goods and Services Tax): Concept and key-features	• Understand the concept of GST

Unit 10: International Trade

International trade: concept and benefits	• Understand the concept of international trade. • Describe the scope of international trade to the nation and business firms.
Export trade – Meaning and procedure	• State the meaning and objectives of export trade. • Explain the important steps involved in executing export trade.
Import Trade - Meaning and procedure	• State the meaning and objectives

	of import trade. • Discuss the important steps involved in executing import trade.
Documents involved in International Trade; indent, letter of credit, shipping order, shipping bills, mate's receipt (DA/DP)	• Develop an understanding of the various documents used in international trade. • Identify the specimen of the various documents used in international trade. • Highlight the importance of the documents needed in connection with international trade transactions
World Trade Organization (WTO) meaning and objectives	• State the meaning of World Trade Organization. • Discuss the objectives of World Trade Organization in promoting international trade.

Unit 11: Project Work

As per CBSE guidelines.

Suggested Question Paper Design
Business Studies (Code No. 054)
Class XI (2024-25)
March 2025 Examination

Marks: 80 **Duration: 3 hrs.**

SN	Typology of Questions	Marks	Percentage
1	**Remembering and Understanding**: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	44	55%
2	**Applying**: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way	19	23.75%
3	**Analysing, Evaluating and Creating:** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations. Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	17	21.25%
	Total	**80**	**100%**

Business Studies
CLASS–XII (2024-25)

Theory: 80 Marks **3 Hours**
Project: 20 Marks

Units		Periods	Marks
Part A	**Principles and Functions of Management**		
1.	Nature and Significance of Management	12	16
2	Principles of Management	14	
3	Business Environment	12	
4	Planning	14	14
5	Organising	15	
6	Staffing	16	20
7	Directing	15	
8	Controlling	12	
	Total	**110**	**50**
Part B	**Business Finance and Marketing**		
9	Financial Management	20	15
10	Financial Markets	18	
11	Marketing Management	30	15
12	Consumer Protection	12	
	Total	**80**	**30**
Part C	**Project Work (One)**	**30**	**20**

Part A: Principles and Functions of Management

Unit 1: Nature and Significance of Management

Concept	After going through this unit, the student/ learner would be able to:
Management - concept, objectives, and importance	• Understand the concept of management. • Explain the meaning of 'Effectiveness and Efficiency. • Discuss the objectives of management. • Describe the importance of management.
Management as Science, Art and Profession	• Examine the nature of management as a science, art and profession.
Levels of Management	• Understand the role of top, middle and lower levels of management
Management functions-planning, organizing, staffing, directing and controlling	• Explain the functions of management
Coordination- concept and importance	• Discuss the concept and

	characteristics of coordination. • Explain the importance of coordination.

Unit 2: Principles of Management

Principles of Management - concept and significance	• Understand the concept of principles of management. • Explain the significance of management principles.
Fayol's principles of management	• Discuss the principles of management developed by Fayol.
Taylor's Scientific management - principles and techniques	• Explain the principles and techniques of 'Scientific Management'. • Compare the contributions of Fayol and Taylor.

Unit 3: Business Environment

Business Environment- concept and importance	• Understand the concept of 'Business Environment'. • Describe the importance of business environment
Dimensions of Business Environment - Economic, Social, Technological, Political and Legal Demonetization - concept and features	• Describe the various dimensions of 'Business Environment'. • Understand the concept of demonetization

Unit 4: Planning

Planning: Concept, importance and limitation	• Understand the concept of planning. • Describe the importance of planning. • Understand the limitations of planning.
Planning process	• Describe the steps in the process of planning.
Single use and Standing Plans. Objectives, Strategy, Policy, Procedure, Method, Rule, Budget and Programme	• Develop an understanding of single use and standing plans • Describe objectives, policies, strategy, procedure, method, rule, budget and programme as types of plans.

Unit 5: Organising

Organising: Concept and importance	• Understand the concept of organizing as a structure and as a

	process. • Explain the importance of organising.
Organising Process	• Describe the steps in the process of organizing
Structure of organisation- functional and divisional concept. Formal and informal organization - concept	• Describe functional and divisional structures of organisation. • Explain the advantages, disadvantages and suitability of functional and divisional structure. • Understand the concept of formal and informal organisation. • Discuss the advantages, disadvantages of formal and informal organisation.
Delegation: concept, elements and importance	• Understand the concept of delegation. • Describe the elements of delegation. • Appreciate the importance of Delegation.
Decentralization: concept and importance	• Understand the concept of decentralisation. • Explain the importance of decentralisation. • Differentiate between delegation and decentralisation.

Unit 6: Staffing

Staffing: Concept and importance of staffing	• Understand the concept of staffing. • Explain the importance of staffing
Staffing as a part of Human Resource Management concept	• Understand the specialized duties and activities performed by Human Resource Management
Staffing process	• Describe the steps in the process of staffing
Recruitment process	• Understand the meaning of recruitment. • Discuss the sources of recruitment. • Explain the merits and demerits of internal and external sources of recruitment.
Selection – process	• Understand the meaning of selection. • Describe the steps involved in the process of selection.
Training and Development - Concept and importance, Methods of training - on the	• Understand the concept of training and development.

job and off the job - vestibule training, apprenticeship training and internship training	• Appreciate the importance of training to the organisation and to the employees. • Discuss the meaning of induction training, vestibule training, apprenticeship training and internship training. • Differentiate between training and development. • Discuss on the job and off the job methods of training.

Unit 7: Directing

Directing: Concept and importance	• Describe the concept of directing. • Discuss the importance of directing
Elements of Directing	• Describe the various elements of directing
Motivation - concept, Maslow's hierarchy of needs, Financial and non-financial incentives	• Understand the concept of motivation. • Develop an understanding of Maslow's Hierarchy of needs. • Discuss the various financial and non-financial incentives.
Leadership - concept, styles - authoritative, democratic and laissez faire	• Understand the concept of leadership. • Understand the various styles of leadership.
Communication - concept, formal and informal communication; barriers to effective communication, how to overcome the barriers?	• Understand the concept of communication • Understand the elements of the communication process. • Discuss the concept of formal and informal communication. • Discuss the various barriers to effective communication. • Suggest measures to overcome barriers to communication.

Unit 8: Controlling

Controlling - Concept and importance	• Understand the concept of controlling. • Explain the importance of controlling.
Relationship between planning and controlling	• Describe the relationship between planning and controlling
Steps in process of control	• Discuss the steps in the process of controlling.

Part B: Business Finance and Marketing

Unit 9: Financial Management

Financial Management: Concept, role and objectives	• Understand the concept of financial management. • Explain the role of financial management in an organisation. • Discuss the objectives of financial management
Financial decisions: investment, financing and dividend - Meaning and factors affecting	• Discuss the three financial decisions and the factors affecting them.
Financial Planning - concept and importance	• Describe the concept of financial planning and its objectives. • Explain the importance of financial planning.
Capital Structure – concept and factors affecting capital structure	• Understand the concept of capital structure. • Describe the factors determining the choice of an appropriate capital structure of a company.
Fixed and Working Capital - Concept and factors affecting their requirements	• Understand the concept of fixed and working capital. • Describe the factors determining the requirements of fixed and working capital.

Unit 10: Financial Markets

Financial Markets: Concept	• Understand the concept of financial market.
Money Market: Concept	• Understand the concept of money market.
Capital market and its types (primary and secondary)	• Discuss the concept of capital market. • Explain primary and secondary markets as types of capital market. • Differentiate between capital market and money market. • Distinguish between primary and secondary markets.
Stock Exchange - Functions and trading procedure	• Give the meaning of a stock exchange. • Explain the functions of a stock exchange. • Discuss the trading procedure in a stock exchange.