

Grade 11 & Grade 12 (Science) – Learning Area specific course descriptions

ENGLISH

The objective of the course is to make the students proficient in the English Language. It is designed to enable students to cater to the requirements of academic study as well as language skill at workplace, to listen, read and comprehend presentations on various topics, to develop greater confidence and proficiency in the use of language skills (Reading, Writing, listening and Speaking), to participate in group discussions, interviews, and to perceive the over-all meaning and organization of the text.

Reading Skill – Development of major reading skills – skimming, scanning and inferential reading and development of vocabulary.

Writing Skill – Develop enhanced capabilities to make a purposeful, personalized and imaginative written response.

Literature – Aims at deeper understanding of the text and understand local, global and thematic content of the lesson. The course also develops the capacity to appreciate literary use of English and also use English creatively and imaginatively. Students are equipped to read and comprehend extended texts, in the genre – fiction, poetry, biography, autobiography and travel.

PHYSICS

In Grade 11 and Grade 12, the Physics curriculum emphasises on basic conceptual understanding of the content. The curriculum promotes problem-solving abilities and application of concepts. Students are exposed to different processes used in Physics-related industrial and technological applications, and create experimental, observational, decision making and investigatory skills in the learners. It also promotes creative thinking in learners, develops conceptual competence in the learners and makes them realize and appreciate the interface of Physics with other disciplines.

CHEMISTRY

The Chemistry curriculum prepares students to meet the challenges of academic and professional courses after the senior secondary stage. Great emphasis is laid on use of new nomenclature, symbols and formulations, teaching of fundamental concepts and application of concepts in Chemistry in industry and technology. Students explore the various emerging new areas of all subjects and are apprised with their relevance in future studies and their application in various spheres of Sciences and Technology. They also learn to face various challenges related to health, nutrition, environment, population weather, industries and agriculture. The curriculum aims to develop problem solving skills in students, exposing them to different processes used in industries and their technological applications. It develops an interest in students to study Chemistry as a discipline and integrate life skills and values in the context of Chemistry.

BIOLOGY

The Biology curriculum emphasises on the underlying principles that are common to animals and plants as well as highlighting the relationship of Biology with other areas of knowledge. It promotes understanding of basic principles of Biology. Students are encouraged to learn more about the subject's emerging knowledge and its relevance to individual and society. They develop rational and scientific attitude towards issues related to population, environment and development. Students also explore the various environmental issues and their appropriate solutions. The curriculum fosters awareness amongst students about diversity in the living organisms and developing respect for other living beings. Students learn to appreciate that the most complex biological phenomena are built on essentially simple processes.

MATHEMATICS

The Mathematics curriculum of Grade 11 and Grade 12 helps students acquire the knowledge and critical understanding, particularly by way of visualization of basic concepts, terms, principles, symbols and mastery of underlying processes and skills. Students identify the flow of reasons while proving a result or solving a problem. They apply the knowledge and skills acquired to solve problems and wherever possible, by more than one method. They develop a positive attitude to think, analyse and articulate logically and get acquainted with different aspects of Mathematics used in daily life.

LIFESKILLS

The life-skills curriculum in Senior School is modelled off habits of the mind and heart, used by both students and teachers. This helps students develop a realistic sense of their personal abilities, qualities, strengths and the factors that influence and affect their emotional responses. Students participate in discussions on real life situations and understand how to tackle such instances – learning how to deal with roles and responsibilities and importance of team work. Students are able to express themselves freely in a positive and safe environment.

Through role plays and activities, they learn to show respect for and understand others' perspectives. As learners, they manage and monitor their own emotional responses, and persist in completing tasks and overcoming hurdles. Students are exposed to problem solving and decision making skills that teach them how to use particular strategies to manage themselves in a range of situations. Students reflect on and evaluate their learning, identify personal characteristics and learn from success and failure.

PHYSICAL EDUCATION

The course empowers the students to participate in Physical Activity as they understand how it influences their own well-being and that of others. Students get an idea about the motor skills required to participate successfully in a variety of physical activities. They develop social skills that demonstrate the importance of team work and cooperation in group activities. They also get an understanding of anatomy and physiology in physical education.

COMPUTER SCIENCE – GRADE 11

Students learn about history and evolution of computers, the functional components of computers and their interconnections and understand the concept of booting. They study the classification of computer software and the need, functions and types of Operating systems. Students learn about different number systems and learn to perform conversions between two different number systems. They study about microprocessor, its characteristics and its types.

Students solve problems by using algorithms and flowcharts. They learn about sequential, selection and iteration construct. They learn about error handling. Students learn about C++ character set, tokens, structure of a C++ program, header files and use of I/O operators. They learn to use the C++ editor and compile programs. Students learn about built-in data types, constants, access modifiers, declaration and initialization of variables and assignment statements. They learn about types of operators, precedence of operators, automatic conversion of data types in expressions and type casting. Students learn to write conditional statements and learn the use of BREAK. They understand how loops work and write programs using DO-WHILE, WHILE and FOR loops. They get an introduction to user-defined function and its requirements. They learn to define a function, invoke it, pass arguments to a function, and specify argument data type. They study the scope rules of local and global variables. Students get an introduction to single and two dimensional arrays. They understand how strings are declared and initialized and how string manipulations can be performed.

Students get an introduction to user defined data types. They learn to define a structure, declare structure variables, access structure variables and pass structures to functions as value and reference. They define a macro using #define pre-processor directive. They build projects using C++ concepts.

Practical Skills:

- Write, compile, and debug C++ programs.
- Apply algorithmic thinking to solve programming problems.
- Use appropriate variables and data types during program development.
- Write and execute C++ functions for specific purposes.
- Apply decision and loop structures in C++ programs to solve specific programming questions.
- Identify errors and debug C++ programs.
- Write programs to perform array manipulations.
- Write programs to perform string manipulations.
- Perform matrix operations on two dimensional arrays.
- Store and display information using C++ structures.

COMPUTER SCIENCE – GRADE 12

Students understand concepts related to OOP. They understand namespaces and scope rules. They define classes. They create instance objects and distinguish between class attributes and instance attributes. They add methods dynamically and access attributes and methods. Students understand the concept of Inheritance and describe the types of Inheritance. They learn about overriding methods. They learn about abstract methods. Students understand data structures and sequential memory allocation. They learn basic list operations. They learn about searching and sorting techniques. Students learn about Stack and Queue data structures and related applications. Students distinguish between text and binary file. They learn to open and close files in Python. They read and write data in files. They learn about Exception handling in Python and the different types of exceptions that can arise. They learn to generate exceptions and handle multiple exceptions. They write and invoke generator functions and compare them with regular functions.

Students learn about databases, DBMS and RDBMS. They define and manipulate data using MySQL. Students learn Fundamental concepts and basic laws of Boolean algebra. They apply rules to simplify /expand Boolean terms / functions. They simplify the Boolean functions using K maps and algebraic method. They learn about universality of NAND & NOR gates.

Students learn about basic networking concepts, network security, types of transmission media, components of a network, types of network and various data communication terminologies and protocols. They discuss the use of cookies, firewalls and ethical hacking. They build projects using Python.

Practical Skills:

1. Write Python programs using objects: Strings, Dictionaries, Tuples and Lists.
2. Utilize built-in functions belonging to String, Dictionary, Tuple and List objects in Python programs.
3. Use nested lists to perform matrix operations on two dimensional arrays.
4. Write Python programs using classes and instances for specific purposes.
5. Apply inheritance and function overriding concepts in Python programs.
6. Apply operator overloading concept in Python class.
7. Write Python programs to demonstrate standard searching and sorting algorithms.
8. Write Python programs to create stack and queue data structures and to perform stack and queue operations.
9. Use file handling techniques to insert, delete and replace data in text and binary files.
10. Create generator functions and invoke them for specific programming problems.
11. Apply exception handling techniques when needed in programs.
12. Create tables and add data to tables in MySQL.
13. Use specific commands to query data in MySQL.