Grade 11 & Grade 12 (Science) – Learning Area Specific Course Descriptions

CMR NATIONAL PUBLIC SCHOOL

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 skills at the 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 overall 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 a deeper comprehension of the text and understand the 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 which includes Kinematics, Thermodynamics,Electrostatics ,Electronic Devices,etc. 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.

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MATHEMATICS

The Mathematics curriculum of Grade 11 and Grade 12 helps students acquire knowledge and critical understanding, particularly by way of visualization of basic concepts, terms, principles, symbols and mastery of underlying processes and skills. The content is inclusive of advanced concepts viz. Calculus Three dimensional Geometry,Statistics and Probability,etc.Students identify the flow of reasons while proving a result or solving a problem. They apply the knowledge and skills acquired to solve problems 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 the 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 the importance of teamwork. 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 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 teamwork and cooperation in group activities. They also get an understanding of anatomy and physiology in physical education.

COMPUTER SCIENCE – GRADE 11

Students learn about the functional components of computers and mobile systems. They examine the interconnections of components. They get an introduction to the concept of booting. They study the classification of computer software and the role of an operating system as a Resource Manager. Students learn about different number systems and learn to perform conversions between different number systems. They get an introduction to Boolean logic, operations and theorems. Students prove Boolean theorems and equations using truth tables.

Students solve computational problems using algorithms and flowcharts. They learn about sequential, selection and iteration constructs.
Students learn about Python character set, tokens, structure of a Python program. They learn to use Python in IDLE mode and script mode to write programs. Students classify data types in Python. They learn about types of operators, precedence of operators, automatic conversion of data types in expressions and type casting.

They learn about exceptions, errors and debugging in Python. Students learn to write conditional statements and learn the use of jump statements: BREAK and CONTINUE. They understand how loops work and write programs using WHILE-ELSE and FOR-ELSE loops. Students get an introduction to Python collections. They use lists to implement search and sort algorithms. They get familiar with built in list and tuple functions. They investigate the use of forward and backward indexing in Python sequences. Students compare lists and tuples. They understand how string manipulations can be performed. Students get an introduction to Dictionaries and learn to search for key-value pairs, update and delete items in dictionaries. Students explore the idea of cyber safety, digital footprints, usage of appropriate social media platforms and their effects. They get familiar with terms such as identity theft, cyber bullying, cyber trolling and phishing. They learn about intellectual property rights, plagiarism, digital rights management, and licensing , open source, open data, privacy.

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They discuss impacts in society due to technology, how e-waste can be managed and gender and disability issues in the field of technology.

Practical Skills:

- Write, compile, and execute Python programs.
- Apply algorithmic thinking to solve programming problems.
- Use appropriate variables and data types during program development.
- Compare efficiencies of multiple solutions to a programming question.
- Write and execute Python programs for searching and sorting algorithms.
- Apply decision and loop structures in Python programs to solve specific programming questions.
- Identify errors and debug Python programs.
- Write programs to manipulate Python Collections such as Lists, Tuples, Dictionaries and Strings.

COMPUTER SCIENCE – GRADE 12

Students explore the idea of reusability and procedural programming through functions. They learn about builtin functions, user defined functions and functions in modules. They import functions and modules in Python and write functions to meet specific needs. Students explore the idea of recursion and write recursive functions for specific purposes. Students understand data structures and sequential memory allocation. They learn basic list operations - Traversal in a list, Insertion in a sorted list, Deletion of an element from a list. They write programs to implement Binary Search, queue and stack operations. They learn Infix and Postfix expressions. They convert infix to postfix Evaluation of Postfix Expression. Students understand the importance of data files for permanent storage of data. They distinguish between text and binary files. They learn to open and close files in Python. They read and write data in files. They write programs that manipulate data files. They determine the factors that lead to efficient programming. They get an introduction to relational databases and learn the following MySQL commands: SELECT ... , FROM...WHERE, GROUP BY ....HAVING, ORDER BY, UPDATE, DELETE, ALTER TABLE AND DROP TABLE.

Students learn about basic networking concepts, types of transmission media, components of a network, types of network and various data communication terminologies and protocols. They maintain a practical record. They build projects using Python concepts.

Practical Skills:

- Use Google apps to create and share information and collaborate with peers.
- Write Python programs using functions.
- Demonstrate file handling operations: Read, Write: Insert, Delete, Modify, Append.
- Demonstrate how Python libraries are created and imported.
- Demonstrate recursion through programs such as factorial, Fibonacci numbers; binary search.
- Investigate efficiency of programs through clock time and number of operations.
- Write Python programs to demonstrate standard searching and sorting algorithms.
- Write Python programs to create stack and queue data structures and to perform stack and queue operations.
- Explore Python connectivity with MySQL and read and edit MySQL databases using Python.
- Write and execute MySQL queries using GROUP BY... HAVING, ORDER BY clauses.

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