SYLLABUS FOR THE WRITTEN EXAM TOWARDS TEACH FOR GOA FELLOWS POSITION PUBLISHED VIDE ADVERTISEMENT NO. 2022/01 DATED 05/05/2022

I.	**General English including Grammar**	**10 marks**
II.	**Logical Reasoning and Analytical Ability**	**20 marks**
III.	**CORE-HARDWARE**	**35 marks**
	Logic Design: Number System and codes, Computer arithmetic (fixed and floating point), Boolean Algebra and Logic gates, Design and Analysis & implementation of Combinational Circuits and Sequential logic design	
	Basic Electronics: Semiconductor Basics, Diodes, Transistors, Regulators, Filters, Basic Circuits Concepts, Passive components: Resistance, Inductance, Capacitance, Electric Circuit	
	Computer Networks: Types of networks, Line configuration, Modes of transmission, Network Topologies, OSI Model, TCP/IP Suite, IP addressing: class A, B, C, D, E, Private/Public IP Addresses, IP Subnetting, Networking devices, Routing Basics and Layer 2 Switching fundamentals.	
	Embedded System: Microcontroller Based Embedded System Design, Salient Features of Modern Microcontrollers, Fundamentals of Physical Interfacing, Connecting Input Devices: Switches, Keyboard and Output devices: LEDs, Seven Segment Displays, Fundamentals of Analog to Digital conversion, Digital to Analog Conversion, Pulse width modulation, Timers in Embedded systems, remote access to embedded systems.	
	Robot mechanics: Motors, Gears, Inertia, stress, load-carrying ability, and dynamic response	
	CORE-SOFTWARE	**35 marks**
	Data Structures Linear and non linear data structures, Arrays, Stacks, Queue, Linked list and Tree, Graph, Recursion, Binary search trees, Binary heaps, Graph and Tree Algorithms, Sorting, Searching, Hashing, Complexity.	
	Computer Organization and Architecture	

	Functional blocks of a computer, Data representation, Machine instructions and addressing modes, Instruction pipelining, x86 architecture, Memory organization, Peripheral devices and their characteristics, Input-output subsystems, I/O device interface, I/O transfers, software interrupts, Programs and processes, Pipelining, Parallel Processors, Memory organization.	
	Operating System Operating Systems: Operating System Structure, Operations and Services, System Calls. Operating System Design and Implementation, System Boot, Processes, Threads, Process Scheduling, Inter-process communication, Concurrency and synchronization. Deadlock, CPU scheduling, Memory management and virtual memory, I/O Hardware, File Management, Disk Management, Robot Operating system, Linux based SSH	
	Database Management Systems Database system architecture, Data models, Integrity constraints, Database Design & ER modeling, Normal forms, Structured Query Language (SQL),	
	Software Engineering and Design Software Process Models, Software Requirements, Object oriented design using UML, Software Design, Software Quality, Software Testing.	
	Advanced Areas Machine learning, Web Technologies, Javascript, PHP, Internet, Information Theory , Coding, Internet-of-Things, Computer Cryptography & Network Security.	