SYLLABUS

(a) Name of Post:

Skill Instructor(Mechanical), Skill instructor (Tool & Die), Skill Instructor(Electronics), Skill Instructor(Electrical), Skill Instructor(Civil), Skill instructor(Retail), Skill Instructor(Soft Skill), Skill Instructor(CSE/IT), Skill Instructor(Physics), Skill Instructor(Music),Foreman(Mechanical), Foreman(Electronics), Senior Skill Instructor(Communication Skill), Senior Skill Instructor(Mechanical), Skill Instructor(GIS), Senior Skill Instructor(CSE/IT), Senior Skill Instructor(Electronics), Senior Skill Instructor(Sports), Master Skill Instructor(Mechanical), Master Skill Instructor(Mechatronics) and Master Skill Instructor(Communication Skills):

Test Format:

Section	**A**	**B**
Details	**Domain**	**Skill Test**
Marks	50	50

As per the above format the syllabus is prepared which is placed at **Annexure-A**

(b) Name of Post:

For Skill Instructor(EVS), Skill Instructor (Wellness Management) and Skill Instructor (Agriculture), Skill Instructor (Hospitality), Skill Instructor (MLT), Senior Skill Instructor (Psychology), Senior Skill Instructor (Hospitality), Senior Skill Instructor (MLT).

Format for test:

Section	**A**
Details	**Domain**
Marks	100

As per the above format the syllabus is prepared which is placed at **Annexure-B**.

ANNEXURE - A

SYLLABUS FOR THE POST OF SKILL INSTRUCTOR (MECHANICAL)

Section-A **50 Marks**

Domain Knowledge

Engineering Mechanics: Free-body diagrams and equilibrium; kinematics and dynamics of particles and of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations, collisions.

Mechanics of Materials: Stress and strain, elastic constants, Poisson's ratio; Mohr's circle for plane stress and plane strain; thin cylinders; shear force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; Euler's theory of columns; energy methods; thermal stresses; strain gauges and rosettes; testing of materials with universal testing machine; testing of hardness and impact strength.

Theory of Machines: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of linkages; cams; gears and gear trains; flywheels and governors; balancing of reciprocating and rotating masses; gyroscope.

Unit-B

Vibrations: Free and forced vibration of single degree of freedom systems, effect of damping; vibration isolation; resonance; critical speeds of shafts.

Machine Design: Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints; shafts, gears, rolling and sliding contact bearings, brakes and clutches, springs.

UNIT-C

Fluid Mechanics: Fluid properties; fluid statics, manometry, buoyancy, forces on submerged bodies, stability of floating bodies; control-volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; dimensional analysis; viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends and fittings.

Heat-Transfer: Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler's charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan Boltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis.

Unit-D

Thermodynamics: Thermodynamic systems and processes; properties of pure substances, behaviour of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics; thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations.

Applications: *Power Engineering*: Air and gas compressors; vapour and gas power cycles, concepts of regeneration and reheat. *I.C. Engines*: Air-standard Otto, Diesel and dual cycles. *Refrigeration and air-conditioning*: Vapour and gas refrigeration and heat pump cycles; properties of moist air, psychrometric chart, basic psychrometric processes. *Turbomachinery*: Impulse and reaction principles, velocity diagrams, Pelton-wheel, Francis and Kaplan turbines.

UNIT-E

Engineering Materials: Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials.

Casting, Forming and Joining Processes: Different types of castings, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy. Principles of welding, brazing, soldering and adhesive bonding.

Machining and Machine Tool Operations: Mechanics of machining; basic machine tools; single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, design of jigs and fixtures.

Metrology and Inspection: Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly.

Computer Integrated Manufacturing: Basic concepts of CAD/CAM and their integration tools.

Production Planning and Control: Forecasting models, aggregate production planning, scheduling, materials requirement planning.

Inventory Control: Deterministic models; safety stock inventory control systems.

Operations Research: Linear programming, simplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.

SYLLABUS FOR THE POST OF SKILL INSTRUCTOR (TOOL & DIE)

Section-A **50 Marks**

Domain Knowledge

- **UNIT-I:** Introduction to tooling. Introduction to Jigs and Fixtures, Plane of movements, possible movements of work piece, location of work piece, types of Jigs, Types of Fixtures, Jigs and machine relations. Method of restricting the possible movement (principle, 3-2-1 pin method). Locating method. Introduction of locating devices, its material, types of locators, locator for flat, surface, internal diameter and external profit. Clamping and work holding devices: Ejectors, clamping devices, types of clamps for jig and fixture. Material for ejector and clamps. Drill Bushes Type of drill jigs. Type of fixture. Fixture and machine relations, cutting force on jigs and fixtures, elements of jigs and fixtures, jigs and fixture cutting tool relations, design of jigs and fixtures, failure of jigs and fixtures.
- **Unit-II:** Study of CNC lathe, key board and specifications, Co-ordinate system points, assignments and simulations Absolute and incremental programming assignments and simulations, Manufacturing die as per drawing dimension and maintain die clearance and die land, provide angular clearance after die land.
- **Unit-III:** Cutting clearance: Importance of cutting clearance, typical appearance characteristics, determination of punch and die dimensions. Land and angular clearance: Importance if angular clearance, methods of providing angular clearance. Basic design of guide plate tool. Alignment technique between Punch and Die while assembly. Guide Plate Tool: Construction, function of elements, related design.
- **Unit-IV:** Stoppers: Function, basic stop principles, construction of different types of stoppers. Strippers: Function, types of stripper, constructional details. Gauge: Function of gauge, types of gauge. Pilots: Purpose of pilot, types of pilot, function of pilot, different methods of piloting. Side cutter Shank and positioning Die Set: Different types of die set, die set components, die set material, types of die set, shut height.
- **Unit-V:** Presses: Classification of press, types of a press, parts of a press, press selection, strip feeding arrangement, die cushion. Blanking Tool: Construction, function of elements, related design. Piercing Tool: Construction, function of elements, related design. Ejector and shedders Progressive tool: Construction, function of elements, related design of progressive too, Basic principles of hydraulics/ pneumatics system, advantages and disadvantages of hydraulics and pneumatics systems, theory of Pascal's law, Brahma's press, Pressure and flow, types of valves used in hydraulics and pneumatics system, Forming tool.

SYLLABUS FOR THE POST OF SKILL INSTRUCTOR (ELECTRONICS)

Section-A **50 Marks**

Domain Knowledge

- **UNIT I Overview of Electronic Components & Signals**: Passive Active Components: Resistances, Capacitors, Inductors, Diodes, Transistors, FET, MOS and CMOS and their Applications. Signals: DC/AC, voltage/current, periodic/non-periodic signals, average, rms, peak values, different types of signal waveforms, Ideal/non-ideal voltage/current sources, independent/dependent voltage current sources.
- **UNIT II Overview of Analog Circuits:** Operational Amplifiers-Ideal Op-Amp, Practical op amp, Open loop and closed loop configurations, Application of Op-Amp as amplifier, adder, differentiator and integrator.
- **UNIT III** Overview of Digital Electronics: Introduction to Boolean Algebra, Electronic Implementation of Boolean Operations, Gates-Functional Block Approach, Storage Elements-Flip Flops-A Functional block approach, Counters: Ripple, Up/down and decade, Introduction to digital IC Gates (of TTL Type).
- **Unit IV Electric and Magnetic Circuits:** EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, hysteresis loop, reluctance, leakage factor and BH curve; Electromagnetic induction, Faraday's laws of electromagnetic induction, Lenz's law; Dynamically induced emf; Statically induced emf; Equations of self and mutual inductance; Analogy between electric and magnetic circuits.
- **Unit V A.C. Circuits:** Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor Peak Factor, impedance, phase angle, and power factor; Mathematical and phasor representation of alternating emf and current; Voltage and Current relationship in Star and Delta connections; A.C in resistors, inductors and capacitors; A.C in R-L series, R-C series, R-L-C series and parallel circuits; Power in A. C. Circuits, power triangle. **Transformer and Machines**: General construction and principle of different type of transformers; Emf equation and transformation ratio of transformers; Auto transformers; Construction and Working principle of motors; Basic equations and characteristic of motors.

SYLLABUS FOR TO THE POST OF SKILL INSTRUCTOR (ELECTRICAL)

Section-I **50 Marks**

Domain Knowledge

UNIT-A

Electric Circuits

Network graph, KCL, KVL, Node and Mesh analysis, Transient response of dc and ac networks, Sinusoidal steady-state analysis, Resonance, Passive filters, Ideal current and voltage sources, Thevenin's theorem, Norton's theorem, Superposition theorem, Maximum power transfer theorem, Two-port networks, Three phase circuits, Power and power factor in ac circuits.

UNIT-B

Electromagnetic Fields

Coulomb's Law, Electric Field Intensity, Electric Flux Density, Gauss's Law, Divergence, Electric field and potential due to point, line, plane and spherical charge distributions, Effect of dielectric medium, Capacitance of simple configurations, Biot-Savart's law, Ampere's law, Curl, Faraday's law, Lorentz force, Inductance, Magnetomotive force, Reluctance, Magnetic circuits, Self and Mutual inductance of simple configurations.

UNIT-C

Electrical Machines

Single phase transformer: equivalent circuit, phasor diagram, open circuit and short circuit tests, regulation and efficiency; Three phase transformers: connections, parallel operation; Auto-transformer, Electromechanical energy conversion principles, DC machines: separately excited, series and shunt, motoring and generating mode of operation and their characteristics, starting and speed control of dc motors; Three phase induction motors: principle of operation, types, performance, torque-speed characteristics, no-load and blocked rotor tests, equivalent circuit, starting and speed control; Operating principle of single phase induction motors; Synchronous machines: cylindrical and salient pole machines, performance, regulation and parallel operation of generators, starting of synchronous motor, characteristics; Types of losses and efficiency calculations of electric machines.

UNIT-D

Power Systems

Power generation concepts, ac and dc transmission concepts, Models and performance of transmission lines and cables, Series and shunt compensation, Electric field distribution and insulators, Distribution systems, Per-unit quantities, Bus admittance matrix, Gauss Seidel and Newton-Raphson load flow methods, Voltage and Frequency control, Power factor correction, Symmetrical components, Symmetrical and unsymmetrical fault analysis,

Principles of over-current, differential and distance protection; Circuit breakers, System stability concepts, Equal area criterion.

Control Systems

Mathematical modeling and representation of systems, Feedback principle, transfer function, Block diagrams and Signal flow graphs, Transient and Steady-state analysis of linear time invariant systems, Routh-Hurwitz and Nyquist criteria, Bode plots, Root loci, Stability analysis, Lag, Lead and Lead-Lag compensators; P, PI and PID controllers; State space model, State transition matrix.

UNIT-E

Electrical and Electronic Measurements

Bridges and Potentiometers, Measurement of voltage, current, power, energy and power factor; Instrument transformers, Digital voltmeters and multimeters, Phase, Time and Frequency measurement; Oscilloscopes, Error analysis.

Analog and Digital Electronics

Characteristics of diodes, BJT, MOSFET; Simple diode circuits: clipping, clamping, rectifiers; Amplifiers: Biasing, Equivalent circuit and Frequency response; Oscillators and Feedback amplifiers; Operational amplifiers: Characteristics and applications; Simple active filters, VCOs and Timers, Combinational and Sequential logic circuits, Multiplexer, Demultiplexer, Schmitt trigger, Sample and hold circuits, A/D and D/A converters, 8085Microprocessor: Architecture, Programming and Interfacing.

SYLLABUS FOR THE POST OF SKILL IINSTRUCTOR(CIVIL)

Section-A **50 Marks**

Domain Knowledge

Unit-I

Engineering Mechanics: System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Friction and its applications; Kinematics of point mass and rigid body; Centre of mass; Euler's equations of motion; Impulse-momentum; Energy methods; Principles of virtual work.

Solid Mechanics: Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Theories of failures; Simple bending theory, flexural and shear stresses, shear centre; Uniform torsion, buckling of column, combined and direct bending stresses.

Unit-II

Structural Analysis: Statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis.

Construction Materials and Management: Construction Materials: Structural steel - composition, material properties and behaviour; Concrete - constituents, mix design, short-term and long-term properties; Bricks and mortar; Timber; Bitumen. Construction Management: Types of construction projects; Tendering and construction contracts; Rate analysis and standard specifications; Cost estimation; Project planning and network analysis - PERT and CPM.

Unit-III

Concrete Structures: Working stress, Limit state and Ultimate load design concepts; Design of beams, slabs, columns; Bond and development length; Pre stressed concrete; Analysis of beam sections at transfer and service loads.

Steel Structures: Working stress and Limit state design concepts; Design of tension and compression members, beams and beam- columns, column bases; Connections - simple and eccentric, beam-column connections, plate girders and trusses; Plastic analysis of beams and frames.

Unit-IV

Soil Mechanics: Origin of soils, soil structure and fabric; Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability - one dimensional flow, Darcy's law; Seepage through soils - two-dimensional flow, flow nets, uplift pressure, piping; Principle of effective stress, capillarity, seepage force and quicksand condition; Compaction in laboratory and field conditions; One dimensional

consolidation, time rate of consolidation; Mohr's circle, stress paths, effective and total shear strength parameters, characteristics of clays and sand.

Foundation Engineering: Sub-surface investigations - scope, drilling bore holes, sampling, plate load test, standard penetration and cone penetration tests; Earth pressure theories - Rankine and Coulomb; Stability of slopes - finite and infinite slopes, method of slices and Bishop's method; Stress distribution in soils - Boussinesq's and Westergaard's theories, pressure bulbs; Shallow foundations - Terzaghi's and Meyerhoff's bearing capacity theories, effect of water table; Combined footing and raft foundation; Contact pressure; Settlement analysis in sands and clays; Deep foundations - types of piles, dynamic and static formulae, load capacity of piles in sands and clays, pile load test, negative skin friction.

Unit-V

Water and Waste Water: Quality standards, basic unit processes and operations for water treatment. Drinking water standards, water requirements, basic unit operations and unit processes for surface water treatment, distribution of water. Sewage and sewerage treatment, quantity and characteristics of wastewater. Primary, secondary and tertiary treatment of wastewater, effluent discharge standards. Domestic wastewater treatment, quantity of characteristics of domestic wastewater, primary and secondary treatment. Unit operations and unit processes of domestic wastewater, sludge disposal.

Air Pollution: Types of pollutants, their sources and impacts, air pollution meteorology, air pollution control, air quality standards and limits.

Municipal Solid Wastes: Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment and disposal).

Noise Pollution: Impacts of noise, permissible limits of noise pollution, measurement of noise and control of noise pollution.

SYLLABUS FORTHE POST OF SKILL IINSTRUCTOR(RETAIL)

Section-A **50 Marks**

Domain Knowledge

- **UNIT-I Awareness of retail sector** : Familiarization with the day to day activity of the store. Orientation to product with various categories. Familiarization of scanning and other security system. Familiarization with procedure and system. Introduction to the retail food safety practice. Familiarization with various retail equipment.
- **UNIT-II Customer Relation** Basic of Consumer Behaviour. Dynamic of Customers. Build relationship with Customers. Solving Customer Queries. Checking facilities for the Customers. Customer feedback and Complaint Analysis. Interaction with Customers
- **UNIT-III Merchandising** Introduction to Merchandising. Visual Merchandising, Retail visual Illustrations. Merchandise Product Concept of 5-S, House Keeping and Shop Organization. Inventory Management Recording and Reporting. Packing of Product. Product Display. Dispatching Product
- **UNIT-IV Selling** Basic of Selling. Basic of Sales Inventory. Suggestive Selling & selling skill advise on product and services. Selling high end product. Handling complex sale situations. Dynamic of sale and service delivery. Retail sales key performance indicators. Achievements of sales Targets. Customer Interaction during selling..
- **UNIT-V Laws & Standard Norms** Basic introduction to Laws relating to Customer protection. Sales tax, WET, Excise, Octroi 2 Product guarantee and warrantee. 2 Introduction to BIS, ISO, CE marketing , packaged commodity rules & other standard norms. Laws relating to weigh and measurement.

SYLLABUS TO THE POST OF SKILL IINSTRUCTOR (SOFT SKILL)

Section-A **50 Marks**

Domain Knowledge

UNIT-I

The elements of Communication, The importance of communication through English at the present time. The process of communication and factors that influence communication sender, receiver, channel, code, topic, message, context, feedback, noise, filters & barriers, The importance of audience and purpose, The information gap principle: given and new information, information overload, Verbal and non-verbal communication: body language, Comparing general communication and business communication

UNIT-II

The sounds of English, Vowels, diphthongs, consonants, consonant clusters , The International Phonetic Alphabet (IPA): Phonemic transcription, Problem Sounds , Syllable division and word stress , Sentence rhythm and weak forms , Contrastive stress in sentences to highlight different words , Intonation: Falling, rising and falling-rising tones , Varieties of Spoken English: Standard Indian, American and British (Note: This unit should be taught in a simple, non-technical manner, avoiding technical terms as far as possible.)

UNIT- III

Review of English grammar, Static and Dynamic Verbs , The auxiliary system: finite and non-finite verbs , Time, tense and aspect , Voice: Active and passive , Modality , Negation, Interrogation: reported and tag questions , Conditionals, , Concord , Phrasal Verbs.

UNIT-IV

Art of Effective communication, Choosing word, Voice, Modulation, Clarity, Time, Simplification of words.

UNIT-V

Technical Communication, Applying soft skills across cultures, Case Studies, Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligence and empathy etc.

SYLLABUS THE POST OF SKILL IINSTRUCTOR(CSE/IT)

Section-A **50 Marks**

Domain Knowledge

Unit-A

Digital logic : Binary Systems and Logic Circuits: Number Systems, Logic Gates, Logic Family Terminology. Boolean algebra and Mapping Methods: Boolean Algebra, Karnaugh Maps, Realizing Logic Function with Gates, Combinational Design Examples. Combinational Logic with Multiplexers and Decoders, Overview of Sequential circuits: Flip Flops, Counters and Registers. Logic Families: Transistor-Transistor Logic(TTL), Emitter-Coupled Logic(ECL), MOSFET Logic, TTL Gates. Programmable Logic Devices: Introduction to Programmable Logic Devices,

Computer Organisation and Architecture : Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode). Central Processing Unit: General register organization, stack organization, Instruction formats, Data transfer and manipulation, program control. RISC & CISC architecture. Pipeline and Vector processing: Pipeline structure, speedup, efficiency, throughput and bottlenecks. Arithmetic and Instruction pipeline. Stored program architecture of computers, Storage device- Primary memory, and Secondary storage, Random, Direct and Sequential access methods, Concepts of High-level, Assembly and Low-level languages,

UNIT-B

Programming in C and C++ : Programming in C- flow chart, data types, assignment statements, input-output statements, developing simple C programs, If statement, looping concept:for loops, while loops, do-while loops, switch statement, break statement, continue statement, development of C programs using above statements, Arrays, functions, parameter passing, recursion, Programming in C using these statements, Structures, files, pointers and file handling.

Concept of object, class, objects as variables of class data type, difference in structures and class in terms of access to members, private and public Basics of C++. Friend functions and classes, using this pointer, creating and destroying objects dynamically using new and delete operators. Constructors and destructors, Static class members, container classes and iterators, proxy classes. members of a class, data & function members. Characteristics of OOP- Data hiding, Encapsulation, data security. Operator overloading: Overloading stream function, binary operators and unary operators .

Inheritance: constructors and destructors in derived classes, public, private and protected inheritance, relationship among objects in an inheritance hierarchy, abstract classes, virtual functions and dynamic binding, virtual destructors. Templates, exception handling.

UNIT-C

Data structure and Algorithms: Linear Data Structures: Linear linked lists: singly, doubly and circularly. Comparison of arrays and linked lists as data structures. Linked implementation of stack, queue and dequeue. Insertion, deletion and traversal of stack, queue, dequeue implemented using linked structures.

Non-Linear Structures: Trees definition, characteristics, and Binary tree: different types of binary trees based on distribution of nodes, binary tree (threaded and unthreaded) as data structure, insertion, deletion and traversal of binary trees, constructing binary tree from traversal results. Threaded binary Tree. AVL tree: Concept of balanced trees, balance factor in AVL trees balancing, AVL tree after insertion and deletion.

Searching, sorting, hashing. Asymptotic worst case time and space complexity. sparse matrices for transposing & multiplication, stack, queue, dequeue, circular queue Evaluation of Expression: Concept of precedence and associativity in expressions, Evaluation of expression in infix, postfix & prefix forms using stack. Recursion.

Graphs: Definition, Relation between tree & graph, directed and undirected graph, representation of graphs using adjacency matrix and list. Depth first and breadth first traversal of graphs, finding connected components and spanning tree. Single source single destination shortest path algorithms.

UNIT-D

JAVA

Introduction Programming language Types and Paradigms. Features of Java Language, JVM, Bytecode. Java Source File Structure, Compilation, Executions. Basic Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Datatypes, Operators Assignments.

Class Fundamentals, Object & Object reference ,Object Life time & Garbage Collection, Creating and Operating Objects , Constructor & initialization code block, Access Control, Modifiers, methods Nested , Inner Class &Anonymous Classes ,Abstract Class & Interfaces Defining Methods, Argument Passing Mechanism , Method Overloading, Recursion, Dealing with Static Members, Finalize() Method, Native Method. Use of “this “ reference, Use of Modifiers with Classes & Methods, Design of Accessors and Mutator Methods Cloning Objects, shallow and deep cloning, Generic Class Types.

Types of Inheritance in Java, Role of Constructors in inheritance, Overriding Super Class Methods, Use of “super”, Polymorphism in inheritance, Type Compatibility and Conversion Implementing interfaces.

Package, Exception Handling: The Idea behind Exception ,Exceptions & Errors ,Types of Exception ,Control Flow In Exceptions, JVM reaction to Exceptions ,Use of try, catch, finally, throw, throws in Exception Handling ,In-built and User Defined Exceptions, Checked and Un-Checked Exceptions. Thread : Understanding Threads , Needs of Multi-Threaded Programming ,Thread Life-Cycle, Thread Priorities ,Synchronizing Threads,

Operating systems : Overview of operating systems, functionalities and charateristics of OS. Hardware concepts related to OS, CPU states, I/O channels, memory hierarchy, and microprogramming, concept of a process, operations on processes, process states, concurrent processes, process control block, process context. UNIX process control and management, PCB, signals, forks and pipes. Interrupt processing, operating system organisation, OS kernel FLIH, dispatcher. Job and processor scheduling, scheduling algorithms, process hierarchies. Problems of concurrent processes, critical sections, mutual exclusion, synchronisation, deadlock. Mutual exclusion, process co-operation, producer and consumer processes. Semaphores: definition, init, wait, signal operations. Use of semaphores to implement mutex, process synchronisation etc., implementation of semaphores. Critical regions, Conditional Critical Regions, Monitors, Ada Tasks. Interprocess Communication (IPC), Message Passing, Direct and Indirect. Deadlock: prevention, detection, avoidance, banker's algorithm. Memory organisation and management, storage allocation. Virtual memory concepts, paging and segmentation, address mapping. Virtual storage management, page replacemant strategies. File organisation: blocking and buffering, file descriptor, directory structure. File and Directory structures, blocks and fragments, directory tree, inodes, file descriptors, UNIX file structure.

Unit-E

Databases: File Systems Organization, Terminologies, Database characteristics, Data models and Types of data models. Components of DBMS-Relational Algebra. Logical Database Design: Relational DBMS Codd’s Rule, Entity Relationship model, Extended ER Normalization, Functional Dependencies, SQL & Query optimization SQL Standards, Data types, Database Objects- DDL,DML, DCL,TCL-Embedded SQL-Static Vs Dynamic SQL – QUERY OPTIMIZATION: Query Processing and Optimization, Heuristics and Cost Estimates in Query Optimization. Transaction Processing and Concurrency Control. Properties of Transaction, Serializability, Concurrency Control Locking Mechanisms- Two Phase Commit Protocol Deadlock. File Organization, Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Introduction to Distributed Databases

Computer Networks : Concept of layering, LAN technologies (Ethernet), Flow and error control techniques, switching. IPv4/IPv6, routers and routing algorithms (distance vector, link state). TCP/UDP and sockets, congestion control. Application layer protocols (DNS, SMTP, POP, FTP, HTTP). Basics of Wi-Fi. Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls.

SYLLABUS FOR THE POST OF SKILL INSTRUCTOR (PHYSICS)

Section-A **50 Marks**

Domain Knowledge

UNIT 1: Motion in a Straight Line**,** Motion in a Plane**,** Laws of Motion**,** Work, Energy and Power**.**System of Particles and Rotational Motion.

UNIT 2: Mechanical Properties of Solids, Mechanical Properties of Fluids, Thermal Properties of Matter, Thermodynamics and Kinetic Theory.

UNIT 3: Electric Charges and Fields, Electrostatic Potential and Capacitance, Current Electricity and Semiconductor Electronics: Materials, Devices and Simple Circuits.

UNIT 4: Moving Charges and Magnetism, Magnetism and Matter, Electromagnetic Induction, Alternating Current and Electromagnetic Waves.

UNIT 5: Ray Optics and Optical Instruments, Wave Optics, Dual Nature of Radiation and Matter

CRITERIA FOR SELECTION TO THE POST OF SKILL INSTRUCTOR (GIS)

Section-A **50 Marks**

Domain Knowledge

Unit-I: Principles of Remote Sensing and GPS: Definition of Remote Sensing: advantages and limitations, Electro-Magnetic Radiation (EMR)- spectrum properties, wavelength regions and their applications, Interaction of EMR with matter, radiance, reflectance, Spectral signature and its response for Soil, Vegetation and Water. Photo interpretation techniques, Fundamentals and elements of visual photo interpretation, Satellite image vs. Aerial photo interpretation, Digital and analog methods of Image Interpretation, Concepts of digital image and its characteristics, Spectral, Spatial, Radiometric and Temporal resolution. Evolution of Indian Space Programme, Introduction to Weather, Communication and Earth Observation satellites systems. Introduction of Global Positioning System, Control Segment, Space Segments, User Segment, GPS signals and data, Geopositioning – Basic concepts; GNSS, Basics geodesy, Geoid/ datum/Ellipsoid-definition and basic concepts, Application of Geodesy. Satellite Geometry, Satellite signals and its strength, Number of satellites, Effects of Multi path, Ionosphere, Troposphere, Methods-Static & Rapid static, Kinematic-Real time kinematic, Survey: DGPS data processing

Unit-II. Digital Image Processing : System design considerations, Sources of image degradation, Radiometric and Geometric error, Types of atmospheric correction: absolute atmospheric correction and relative atmospheric correction, Interpolation methods. Look-up Tables (LUT) and Image display, Spatial profile and Spectral profile, Contrast stretching: Linear and non-linear methods. Frequency component, low pass filter: Image smoothing, edge-preserving median filter, High passes filtering: Edge enhancement and Edge detection, Gradient filters, Directional and non-directional filtering, Band ratio, Types of vegetation indices. Concept of pattern recognition, Multi-spectral pattern recognition, Spectral discrimination, Unsupervised classification methods, Supervised classification techniques, Accuracy Assessment: User and Producer accuracy, Kappa accuracy. Artificial intelligence, Fuzzy logic, neural networks, Image Fusion, Object Oriented Classification, Hyper spectral remote sensing: atmospheric correction, Data reduction techniques, texture analysis and mineral & vegetation mapping.

Unit-III. Fundamentals of Geographic Information Sciences and Digital Cartography: Basic concepts about spatial information: Brief history and definition of GIS, Manual mapping Vs GIS mapping, Variables- Points, Lines and Areas, Network and Surface, Component of GIS,Fundamentals of data storage: entities or Fields, Introduction to database system: Definition, Purpose, Schema, Relationship and primary/secondary/composite key. Introduction to spatial data input. Spatial and Non spatial data base, spatial data model, Geodatabase, Introduction to Post gres, Spatial representation of data, Spatial relationship, Spatial Indexing methods. Public access to geographic information data; Digital libraries, National & Global Standard - NSDI, GSDI; Global geospatial portals, OGC. SQL, Logical, Boolean, Arithmetical operation and function, Topological relationships; Overlay operations

Feature base topological function –buffer, Eliminate, dissolve, Layer based overlay analysisclip, erase, split, identity, union and intersection, Network analysis.

Unit-IV. Basics of Geostats: Meaning and objectives of measures of central tendency, different measure viz. arithmetic mean, median, mode, geometric mean and harmonic mean. Measure of variation viz. range, quartile deviation mean deviation and standard deviation, co-efficient of variation and skewness, Histograms, Distributions and density. Meaning of correlation, types of correlation – positive and negative correlation, simple, partial and multiple correlation, methods of studying correlation; scatter diagram. Introduction to regression, lines of regression, co-efficient of regression, coefficient of determination, standard error of estimate. Existing statistical models, comparison and significance of different statistical technique, application of Geostats to satellite imagery.

Unit- V. Advances in Geospatial Technology: Electromagnetic spectrum of microwave region, Airborne and Space borne radar systems (SLAR, SAR) parameters, Introduction to LiDAR Remote Sensing and TechnologyLaser altimetry. Advanced Digital Photogrammetry, Orthophoto Generation, Unmanned Aerial Vehicle (UAV Mapping). Web mapping, web page basics, geospatial web services, web mapping–static and interactive web mapping Adding and rendering map layers to a web GIS. symbolizing layers. Building and enabling map services on the GIS server, Web Map Servers- WMS, Web Feature Servers. Web Map servers and Data servers, Configuration, layering, design of interfaces, Quality of Service and Security Issues in the Development of Web GIS - Performance, Security, Scalability. Introduction to open source GIS softwares such as QGIS and its applications. Introduction to various sensors and IoT. Defining GEO-IoT, Integration of IoT with GIS, application of GEO-IoT.

Geostats for spatial and spatio-temporal data: Spatial variations and sampling plans, spatio-temporal reference parameters, Introduction to geo-stats, implications of applying geo-stats, geostatistical mapping, Types of models. Selecting the right spatial prediction technique, example of regression krigging, spatial prediction of categorical variables, geostatistical simulations, fields of applications, probability maps. Usage of R software for statistical computing, libraries required for running simulation, reading KML files to R, exporting raster and vector maps to KML. Sampling optimization algorithms, exploratory data analysis: sampling design, automated mapping. R package required for implementing point patterns, density estimation using kernel smoothing and covariates, point pattern analysis.

SYLLABUS FOR THE POST OF SKILL INSTRUCTOR (MUSIC)

Section-A **50 Marks**

Domain Knowledge

UNIT-I (i) A critical and comparative study of the following Ragas : Devgiri Bilawal, Yamani Bilawal, Ahir Bhairav, Nat Bhairav, Shyam Kalyan, Shuddha Sarang. (ii) General study of the following Ragas: Bilawal, Bhairav, Madhumad Sarang, Knowledge about the notation System of Bhatkhande as well as Vishnu Digamber paddhati. Notation of Vilambit and Drut Khayal/Gat of Ragas prescribed in the syllabus alongwith few Mukt Alaps Tanas and Bol Tanas. iii) A study of the following Talas and ability to write and demonstrate on hands in Dugun, Tigun and chaugun Layakaries,Teental, Jhaptal, Rupak and Keharva.

UNIT-II (i) Genesis of Music, Indian and Western views about the development of Music. (ii) Nature, concept and classifications of Jati described by Bharat, Matang and Sharangdev (iii) ten essentials of Ragas as described in the ancient texts and their application to Medieval and modern musical system. Origin and Development of Gharana-system in Khayal/ Sitar-Vadan, Desirability and possibility of maintaining Gharana in Modern times, The rationale of ancient classification of Indian Musical Instruments, Historical knowledge of the following Instruments: Ektantri, Chitra, Vanshi, Patah, Kansya Tala., Detailed study of Voice- Culture with reference to ancient treaties and recent Scientific Research.

UNIT-III: History of Indian Music: Music in Samhitas, Brahmanas, Aranyakas, Music in Mahakavyakal: 1. Ramayana 2. Mahabharata, Music in Smritis, Music in Kautilya's Arthsastra, Historical Development of Swaras up to 13th Century, A critical study of three grams: 1. Shadaj 2. Madhyam 3. Gandhar, Principals of classification of Raga : Garma -Raga, Deshi-Raga, Dashvidhraag -Vargikaran of Sharangdev, Jatiraga-Vargikaran, Rag-Ragini Vargikaran, Mela-Raga Vargikarn, Thata-Raga Vargikaran, Raganaga-Rag Vargikaran, Relationship of Music and Aesthetics, The rationale of ancient classification of Indian Musical Instruments:- Mattakokila, Vipanchi, Kinnari, Mridanga, Hudakka and Ghanta, Elementary knowledge of Classical dances . Kathak , Bharat Natyam , Kathakali, Manipuri ,Odisi.

UNIT-IV: Applied Music Theory and Musical Compositions: Classification of Indian Musical Instrumental and knowledge of the techniques of the following classical musical instruments of north and south India prevalent in modern time. Vichitra Veena, Sarod, Shahnai, Tabla, Mridangam, Types of Musical Compositions. Prabandha, Dhrupada and Dhamar,

UNIT-V: General study of following Basic Ragas: Miyan Ki Todi, Malkauns. Megh, Study of Folk Music in Punjab: Folk music of Punjab : styles of Singing, Dancing and Instruments, The popular folk tunes of different States e.g. Garba, Raas, Kajri, Chaiti and Jhoomar, Principles of Orchestration and its desirability and possibility in Hindustani Music.

SYLLABUS FOR THE POST OF FOREMAN (MECHANICAL)

Section-A **50 Marks**

Engineering Mechanics: Free-body diagrams and equilibrium; kinematics and dynamics of particles and of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations, collisions.

Mechanics of Materials: Stress and strain, elastic constants, Poisson's ratio; Mohr's circle for plane stress and plane strain; thin cylinders; shear force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; Euler's theory of columns; energy methods; thermal stresses; strain gauges and rosettes; testing of materials with universal testing machine; testing of hardness and impact strength.

Theory of Machines: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of linkages; cams; gears and gear trains; flywheels and governors; balancing of reciprocating and rotating masses; gyroscope.

Unit-B

Vibrations: Free and forced vibration of single degree of freedom systems, effect of damping; vibration isolation; resonance; critical speeds of shafts.

Machine Design: Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints; shafts, gears, rolling and sliding contact bearings, brakes and clutches, springs.

UNIT-C

Fluid Mechanics: Fluid properties; fluid statics, manometry, buoyancy, forces on submerged bodies, stability of floating bodies; control-volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; dimensional analysis; viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends and fittings.

Heat-Transfer: Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler's charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan Boltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis.

Unit-D

Thermodynamics: Thermodynamic systems and processes; properties of pure substances, behaviour of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics; thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations.

Applications: *Power Engineering*: Air and gas compressors; vapour and gas power cycles, concepts of regeneration and reheat. *I.C. Engines*: Air-standard Otto, Diesel and dual cycles. *Refrigeration and air-conditioning*: Vapour and gas refrigeration and heat pump cycles; properties of moist air, psychrometric chart, basic psychrometric processes. *Turbomachinery*: Impulse and reaction principles, velocity diagrams, Pelton-wheel, Francis and Kaplan turbines.

UNIT-E

Engineering Materials: Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials.

Casting, Forming and Joining Processes: Different types of castings, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy. Principles of welding, brazing, soldering and adhesive bonding.

Machining and Machine Tool Operations: Mechanics of machining; basic machine tools; single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, design of jigs and fixtures.

Metrology and Inspection: Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly.

Computer Integrated Manufacturing: Basic concepts of CAD/CAM and their integration tools.

Production Planning and Control: Forecasting models, aggregate production planning, scheduling, materials requirement planning.

Inventory Control: Deterministic models; safety stock inventory control systems.

Operations Research: Linear programming, simplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.

SYLLABUS FOR THE POST OF FOREMAN (ELECTRONICS)

Section-A **50 Marks**

Domain Knowledge

- **UNIT I Overview of Electronic Components & Signals**: Passive Active Components: Resistances, Capacitors, Inductors, Diodes, Transistors, FET, MOS and CMOS and their Applications. Signals: DC/AC, voltage/current, periodic/non-periodic signals, average, rms, peak values, different types of signal waveforms, Ideal/non-ideal voltage/current sources, independent/dependent voltage current sources.
- **UNIT II Overview of Analog Circuits:** Operational Amplifiers-Ideal Op-Amp, Practical op amp, Open loop and closed loop configurations, Application of Op-Amp as amplifier, adder, differentiator and integrator.
- **UNIT III** Overview of Digital Electronics: Introduction to Boolean Algebra, Electronic Implementation of Boolean Operations, Gates-Functional Block Approach, Storage Elements-Flip Flops-A Functional block approach, Counters: Ripple, Up/down and decade, Introduction to digital IC Gates (of TTL Type).
- **Unit IV Electric and Magnetic Circuits:** EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, hysteresis loop, reluctance, leakage factor and BH curve; Electromagnetic induction, Faraday's laws of electromagnetic induction, Lenz's law; Dynamically induced emf; Statically induced emf; Equations of self and mutual inductance; Analogy between electric and magnetic circuits.
- **Unit V A.C. Circuits:** Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor Peak Factor, impedance, phase angle, and power factor; Mathematical and phasor representation of alternating emf and current; Voltage and Current relationship in Star and Delta connections; A.C in resistors, inductors and capacitors; A.C in R-L series, R-C series, R-L-C series and parallel circuits; Power in A. C. Circuits, power triangle. **Transformer and Machines**: General construction and principle of different type of transformers; Emf equation and transformation ratio of transformers; Auto transformers; Construction and Working principle of motors; Basic equations and characteristic of motors.

SYLLABUS FOR THE POST OF SENIOR SKILL INSTRUCTOR (COMMUNICATION SKILL)

Section-A **50 Marks**

Domain Knowledge

Unit-I

The elements of Communication , The importance of communication through English at the present time,The process of communication and factors that influence communication sender, receiver, channel, code, topic, message, context, feedback, noise, filters & barriers, The importance of audience and purpose, The information gap principle: given and new information, information overload , Verbal and non-verbal communication: body language, Comparing general communication and business communication

Unit-II

The sounds of English, Vowels, diphthongs, consonants, consonant clusters , The International Phonetic Alphabet (IPA): Phonemic transcription, Problem Sounds , Syllable division and word stress , Sentence rhythm and weak forms , Contrastive stress in sentences to highlight different words , Intonation: Falling, rising and falling-rising tones , Varieties of Spoken English: Standard Indian, American and British (Note: This unit should be taught in a simple, non-technical manner, avoiding technical terms as far as possible.)

Unit- III

Review of English grammar, Static and Dynamic Verbs , The auxiliary system: finite and non-finite verbs , Time, tense and aspect , Voice: Active and passive , Modality , Negation, Interrogation: reported and tag questions , Conditionals, , Concord , Phrasal Verbs.

Unit-IV

Art of Effective communication, Choosing word, Voice, Modulation, Clarity, Time, Simplification of words.

Unit-V

Technical Communication, Applying soft skills across cultures, Case Studies, Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligence and empathy etc.

CRITERIA FOR SELECTION TO THE POST OF SENIOR SKILL INSTRUCTOR (MECHANICAL)

Section-A **50 Marks**

Domain Knowledge

Unit-I

Engineering Mechanics: Free-body diagrams and equilibrium; kinematics and dynamics of particles and of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations, collisions.

Mechanics of Materials: Stress and strain, elastic constants, Poisson's ratio; Mohr's circle for plane stress and plane strain; thin cylinders; shear force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; Euler's theory of columns; energy methods; thermal stresses; strain gauges and rosettes; testing of materials with universal testing machine; testing of hardness and impact strength.

Theory of Machines: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of linkages; cams; gears and gear trains; flywheels and governors; balancing of reciprocating and rotating masses; gyroscope.

Unit-B

Vibrations: Free and forced vibration of single degree of freedom systems, effect of damping; vibration isolation; resonance; critical speeds of shafts.

Machine Design: Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints; shafts, gears, rolling and sliding contact bearings, brakes and clutches, springs.

UNIT-C

Fluid Mechanics: Fluid properties; fluid statics, manometry, buoyancy, forces on submerged bodies, stability of floating bodies; control-volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; dimensional analysis; viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends and fittings.

Heat-Transfer: Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler's charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan Boltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis.

Unit-D

Thermodynamics: Thermodynamic systems and processes; properties of pure substances, behaviour of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics; thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations.

Applications: *Power Engineering*: Air and gas compressors; vapour and gas power cycles, concepts of regeneration and reheat. *I.C. Engines*: Air-standard Otto, Diesel and dual cycles. *Refrigeration and air-conditioning*: Vapour and gas refrigeration and heat pump cycles; properties of moist air, psychrometric chart, basic psychrometric processes. *Turbomachinery*: Impulse and reaction principles, velocity diagrams, Pelton-wheel, Francis and Kaplan turbines.

UNIT-E

Engineering Materials: Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials.

Casting, Forming and Joining Processes: Different types of castings, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy. Principles of welding, brazing, soldering and adhesive bonding.

Machining and Machine Tool Operations: Mechanics of machining; basic machine tools; single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, design of jigs and fixtures.

Metrology and Inspection: Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly.

Computer Integrated Manufacturing: Basic concepts of CAD/CAM and their integration tools.

Production Planning and Control: Forecasting models, aggregate production planning, scheduling, materials requirement planning.

Inventory Control: Deterministic models; safety stock inventory control systems.

Operations Research: Linear programming, simplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.

SYLLABUS FOR THE POST OF SENIOR SKILL INSTRUCTOR (CSE/IT)

Section-A **50 Marks**

Unit-A

Digital logic : Binary Systems and Logic Circuits: Number Systems, Logic Gates, Logic Family Terminology. Boolean algebra and Mapping Methods: Boolean Algebra, Karnaugh Maps, Realizing Logic Function with Gates, Combinational Design Examples. Combinational Logic with Multiplexers and Decoders, Overview of Sequential circuits: Flip Flops, Counters and Registers. Logic Families: Transistor-Transistor Logic(TTL), Emitter-Coupled Logic(ECL), MOSFET Logic, TTL Gates. Programmable Logic Devices: Introduction to Programmable Logic Devices,

Computer Organisation and Architecture : Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode). Central Processing Unit: General register organization, stack organization, Instruction formats, Data transfer and manipulation, program control. RISC & CISC architecture. Pipeline and Vector processing: Pipeline structure, speedup, efficiency, throughput and bottlenecks. Arithmetic and Instruction pipeline. Stored program architecture of computers, Storage device- Primary memory, and Secondary storage, Random, Direct and Sequential access methods, Concepts of High-level, Assembly and Low-level languages,

UNIT-B

Programming in C and C++ : Programming in C- flow chart, data types, assignment statements, input-output statements, developing simple C programs, If statement, looping concept:for loops, while loops, do-while loops, switch statement, break statement, continue statement, development of C programs using above statements, Arrays, functions, parameter passing, recursion, Programming in C using these statements, Structures, files, pointers and file handling.

Concept of object, class, objects as variables of class data type, difference in structures and class in terms of access to members, private and public Basics of C++. Friend functions and classes, using this pointer, creating and destroying objects dynamically using new and delete operators. Constructors and destructors, Static class members, container classes and iterators, proxy classes. members of a class, data & function members. Characteristics of OOP- Data hiding, Encapsulation, data security. Operator overloading: Overloading stream function, binary operators and unary operators .

Inheritance: constructors and destructors in derived classes, public, private and protected inheritance, relationship among objects in an inheritance hierarchy, abstract classes, virtual functions and dynamic binding, virtual destructors. Templates, exception handling.

UNIT-C

Data structure and Algorithms: Linear Data Structures: Linear linked lists: singly, doubly and circularly. Comparison of arrays and linked lists as data structures. Linked implementation of stack, queue and dequeue. Insertion, deletion and traversal of stack, queue, dequeue implemented using linked structures.

Non-Linear Structures: Trees definition, characteristics, and Binary tree: different types of binary trees based on distribution of nodes, binary tree (threaded and unthreaded) as data structure, insertion, deletion and traversal of binary trees, constructing binary tree from traversal results. Threaded binary Tree. AVL tree: Concept of balanced trees, balance factor in AVL trees balancing, AVL tree after insertion and deletion.

Searching, sorting, hashing. Asymptotic worst case time and space complexity. sparse matrices for transposing & multiplication, stack, queue, dequeue, circular queue Evaluation of Expression: Concept of precedence and associativity in expressions, Evaluation of expression in infix, postfix & prefix forms using stack. Recursion.

Graphs: Definition, Relation between tree & graph, directed and undirected graph, representation of graphs using adjacency matrix and list. Depth first and breadth first traversal of graphs, finding connected components and spanning tree. Single source single destination shortest path algorithms.

UNIT-D

JAVA

Introduction Programming language Types and Paradigms. Features of Java Language, JVM, Bytecode. Java Source File Structure, Compilation, Executions. Basic Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Datatypes, Operators Assignments.

Class Fundamentals, Object & Object reference ,Object Life time & Garbage Collection, Creating and Operating Objects , Constructor & initialization code block, Access Control, Modifiers, methods Nested , Inner Class &Anonymous Classes ,Abstract Class & Interfaces Defining Methods, Argument Passing Mechanism , Method Overloading, Recursion, Dealing with Static Members, Finalize() Method, Native Method. Use of “this “ reference, Use of Modifiers with Classes & Methods, Design of Accessors and Mutator Methods Cloning Objects, shallow and deep cloning, Generic Class Types.

Types of Inheritance in Java, Role of Constructors in inheritance, Overriding Super Class Methods, Use of “super”, Polymorphism in inheritance, Type Compatibility and Conversion Implementing interfaces.

Package, Exception Handling: The Idea behind Exception ,Exceptions & Errors ,Types of Exception ,Control Flow In Exceptions, JVM reaction to Exceptions ,Use of try, catch, finally, throw, throws in Exception Handling ,In-built and User Defined Exceptions, Checked and Un-Checked Exceptions. Thread : Understanding Threads , Needs of Multi-Threaded Programming ,Thread Life-Cycle, Thread Priorities ,Synchronizing Threads,

Operating systems : Overview of operating systems, functionalities and charateristics of OS. Hardware concepts related to OS, CPU states, I/O channels, memory hierarchy, and microprogramming, concept of a process, operations on processes, process states, concurrent processes, process control block, process context. UNIX process control and management, PCB, signals, forks and pipes. Interrupt processing, operating system organisation, OS kernel FLIH, dispatcher. Job and processor scheduling, scheduling algorithms, process hierarchies. Problems of concurrent processes, critical sections, mutual exclusion, synchronisation, deadlock. Mutual exclusion, process co-operation, producer and consumer processes. Semaphores: definition, init, wait, signal operations. Use of semaphores to implement mutex, process synchronisation etc., implementation of semaphores. Critical regions, Conditional Critical Regions, Monitors, Ada Tasks. Interprocess Communication (IPC), Message Passing, Direct and Indirect. Deadlock: prevention, detection, avoidance, banker's algorithm. Memory organisation and management, storage allocation. Virtual memory concepts, paging and segmentation, address mapping. Virtual storage management, page replacemant strategies. File organisation: blocking and buffering, file descriptor, directory structure. File and Directory structures, blocks and fragments, directory tree, inodes, file descriptors, UNIX file structure.

Unit-E

Databases: File Systems Organization, Terminologies, Database characteristics, Data models and Types of data models. Components of DBMS-Relational Algebra. Logical Database Design: Relational DBMS Codd’s Rule, Entity Relationship model, Extended ER Normalization, Functional Dependencies, SQL & Query optimization SQL Standards, Data types, Database Objects- DDL,DML, DCL,TCL-Embedded SQL-Static Vs Dynamic SQL – QUERY OPTIMIZATION: Query Processing and Optimization, Heuristics and Cost Estimates in Query Optimization. Transaction Processing and Concurrency Control. Properties of Transaction, Serializability, Concurrency Control Locking Mechanisms- Two Phase Commit Protocol Deadlock. File Organization, Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Introduction to Distributed Databases

Computer Networks: Concept of layering, LAN technologies (Ethernet), Flow and error control techniques, switching. IPv4/IPv6, routers and routing algorithms (distance vector, link state). TCP/UDP and sockets, congestion control. Application layer protocols (DNS, SMTP, POP, FTP, HTTP). Basics of Wi-Fi. Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls.

SYLLABUS FOR THE POST OF SENIOR SKILL INSTRUCTOR (ELECTRONICS)

Section-A **50 Marks**

Domain Knowledge

- **UNIT I Overview of Electronic Components & Signals**: Passive Active Components: Resistances, Capacitors, Inductors, Diodes, Transistors, FET, MOS and CMOS and their Applications. Signals: DC/AC, voltage/current, periodic/non-periodic signals, average, RMS, peak values, different types of signal waveforms, Ideal/non-ideal voltage/current sources, independent/dependent voltage current sources.
- **UNIT II Overview of Analog Circuits:** Operational Amplifiers-Ideal Op-Amp, Practical op amp, Open loop and closed loop configurations, Application of Op-Amp as amplifier, adder, differentiator and integrator.
- **UNIT III** Overview of Digital Electronics: Introduction to Boolean Algebra, Electronic Implementation of Boolean Operations, Gates-Functional Block Approach, Storage Elements-Flip Flops-A Functional block approach, Counters: Ripple, Up/down and decade, Introduction to digital IC Gates (of TTL Type).
- **Unit IV Electric and Magnetic Circuits:** EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, hysteresis loop, reluctance, leakage factor and BH curve; Electromagnetic induction, Faraday's laws of electromagnetic induction, Lenz's law; Dynamically induced emf; Statically induced emf; Equations of self and mutual inductance; Analogy between electric and magnetic circuits.
- **Unit V A.C. Circuits:** Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor Peak Factor, impedance, phase angle, and power factor; Mathematical and phasor representation of alternating emf and current; Voltage and Current relationship in Star and Delta connections; A.C in resistors, inductors and capacitors; A.C in R-L series, R-C series, R-L-C series and parallel circuits; Power in A. C. Circuits, power triangle. **Transformer and Machines**: General construction and principle of different type of transformers; Emf equation and transformation ratio of transformers; Auto transformers; Construction and Working principle of motors; Basic equations and characteristic of motors.

SYLLABUS FOR THE POST OF SENIOR SKILL INSTRUCTOR (SPORTS)

Section-A **50 Marks**

UNIT-I: HISTORY, PRINCIPLES AND FOUNDATION OF PHYSICAL EDUCATION; Introduction, Historical Development of Physical Education in India, Foundation of Physical Education, Principles of Physical Education: Biological ß Growth and development ß Age and gender characteristics ß Body Types ß Anthropometric differences.

UNIT-II: ANATOMY AND PHYSIOLOGY; Brief Introduction of Anatomy and physiology in the field of Physical Education, Introduction of Cell and Tissue, The arrangement of the skeleton – Function - of the skeleton – Ribs and Vertebral column and the extremities – joints of the body and their types, Gender differences in the skeleton, Types of muscles, Blood and circulatory system, The Respiratory system, The Digestive system, The Excretory system, The Endocrine glands, Nervous systems, Sense organs.

UNIT-III: OLYMPIC MOVEMENT ; Origin of Olympic Movement, Modern Olympic Games, Different Olympic Games, Committees of Olympic Games.

UNIT-IV: OFFICIATING AND COACHING; Introduction of Officiating and coaching, Coach as a Mentor(Duties of coach in general, pre, during and post game, Philosophy of coaching, Responsibilities of a coach on and off the field, Psychology of competition and coaching), Qualities and Qualifications of Coach and Official(Qualities and qualification of coach and official, General rules of games and sports, Eligibility rules of intercollegiate and inter-university tournaments, preparation of TA, DA bills, Integrity and values of sports)

UNIT-V: YOGA EDUCATION; Introduction, Foundation of Yoga (The Astanga Yoga: Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi, Yoga in the Bhagavadgita - Karma Yoga, Raja Yoga, Jnana Yoga and Bhakti Yoga), Asanas, Yoga Education.

SPORTS NUTRITION AND WEIGHT MANAGEMENT : Introduction to Sports Nutrition, Nutrients: Ingestion to energy metabolism, Nutrition and Weight Management, Steps of planning of Weight Management, Introduction to Sports Training.

SYLLABUS FOR THE POST OF MASTER SKILL INSTRUCTOR (MECHANICAL)

Section-A **50 Marks**

Domain Knowledge

Engineering Mechanics: Free-body diagrams and equilibrium; kinematics and dynamics of particles and of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations, collisions.

Mechanics of Materials: Stress and strain, elastic constants, Poisson's ratio; Mohr's circle for plane stress and plane strain; thin cylinders; shear force and bending moment diagrams; bending and shear stresses; deflection of beams; torsion of circular shafts; Euler's theory of columns; energy methods; thermal stresses; strain gauges and rosettes; testing of materials with universal testing machine; testing of hardness and impact strength.

Theory of Machines: Displacement, velocity and acceleration analysis of plane mechanisms; dynamic analysis of linkages; cams; gears and gear trains; flywheels and governors; balancing of reciprocating and rotating masses; gyroscope.

Unit-B

Vibrations: Free and forced vibration of single degree of freedom systems, effect of damping; vibration isolation; resonance; critical speeds of shafts.

Machine Design: Design for static and dynamic loading; failure theories; fatigue strength and the S-N diagram; principles of the design of machine elements such as bolted, riveted and welded joints; shafts, gears, rolling and sliding contact bearings, brakes and clutches, springs.

UNIT-C

Fluid Mechanics: Fluid properties; fluid statics, manometry, buoyancy, forces on submerged bodies, stability of floating bodies; control-volume analysis of mass, momentum and energy; fluid acceleration; differential equations of continuity and momentum; Bernoulli's equation; dimensional analysis; viscous flow of incompressible fluids, boundary layer, elementary turbulent flow, flow through pipes, head losses in pipes, bends and fittings.

Heat-Transfer: Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, Heisler's charts; thermal boundary layer, dimensionless parameters in free and forced convective heat transfer, heat transfer correlations for flow over flat plates and through pipes, effect of turbulence; heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan Boltzmann law, Wien's displacement law, black and grey surfaces, view factors, radiation network analysis.

Unit-D

Thermodynamics: Thermodynamic systems and processes; properties of pure substances, behaviour of ideal and real gases; zeroth and first laws of thermodynamics, calculation of

work and heat in various processes; second law of thermodynamics; thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations.

Applications: *Power Engineering*: Air and gas compressors; vapour and gas power cycles, concepts of regeneration and reheat. *I.C. Engines*: Air-standard Otto, Diesel and dual cycles. *Refrigeration and air-conditioning*: Vapour and gas refrigeration and heat pump cycles; properties of moist air, psychrometric chart, basic psychrometric processes. *Turbomachinery*: Impulse and reaction principles, velocity diagrams, Pelton-wheel, Francis and Kaplan turbines.

UNIT-E

Engineering Materials: Structure and properties of engineering materials, phase diagrams, heat treatment, stress-strain diagrams for engineering materials.

Casting, Forming and Joining Processes: Different types of castings, design of patterns, moulds and cores; solidification and cooling; riser and gating design. Plastic deformation and yield criteria; fundamentals of hot and cold working processes; load estimation for bulk (forging, rolling, extrusion, drawing) and sheet (shearing, deep drawing, bending) metal forming processes; principles of powder metallurgy. Principles of welding, brazing, soldering and adhesive bonding.

Machining and Machine Tool Operations: Mechanics of machining; basic machine tools; single and multi-point cutting tools, tool geometry and materials, tool life and wear; economics of machining; principles of non-traditional machining processes; principles of work holding, design of jigs and fixtures.

Metrology and Inspection: Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly.

Computer Integrated Manufacturing: Basic concepts of CAD/CAM and their integration tools.

Production Planning and Control: Forecasting models, aggregate production planning, scheduling, materials requirement planning.

Inventory Control: Deterministic models; safety stock inventory control systems.

Operations Research: Linear programming, simplex method, transportation, assignment, network flow models, simple queuing models, PERT and CPM.

SYLLABUS FOR THE POST OF MASTER SKILL INSTRUCTOR (MECHATRONICS)

Section-A **50 Marks**

Domain Knowledge

Unit-I: Workshop Technology- manufacturing processes, machining processes, selection of a manufacturing process, Machine Tools, machining operations, features of metal cutting, cutting tool materials, Specification and selection of cutting fluid, conventional machine tools, advanced machining processes.

Unit-II: Industrial Management & Safety- Concept of Quality, Quality Control and Inspection, Organizational Aspects of Quality Assurance, Problem solving tools and techniques, TQM, 5S and safety.

Unit-III: Mechatronics & Applied Mechatronics- Introduction to Mechatronics –systems – concepts of Mechatronics approach, sensors and transducers, basic PLC and its components, Basic of Design of Mechatronics, CONVERTERS, AC to AC Converters, Phase controlled reactifier, Operational Amplifiers

Hydraulic and Pneumatic- Hydraulic fundamentals, hydraulic systems, their components, function and constructions. Fundamentals of Pneumatics, Pneumatic systems-components, function and constructions. Hydraulic and pneumatic circuits and symbols, construction & principle of basic circuit.

Unit-IV: Digital and Power Electronics: Logic Levels and Pulse Waveforms, Elements and Functions of Digital Logic, Digital Integrated Circuits, Number system and codes, AND, OR, NAND, NOR, Gate Propagation Delay Time, Power Dissipation Norse Immunity, Fan in & Out, Loading Considerations, AND – OR Logic AOL Logic, XOR Logic, Universal Properly of NAND and NOR Logic – Half and Full Adders, Decoders and Encoders – Multiplexers and De-multiplexers, Boolean Algebra and Latches, Power Semi-Conductor Devices, Cyclo Converter, Inverters.

Unit-V: Sensors and Transducers; Principles of Sensors, Displacement Sensors, Force, Torque, Tactile and Pressure Sensors and Transducers, Flow Sensors, Temperature Sensors.

Manufacturing Automation & Ergonomics; Introduction**,** Automated Flow Lines Assembly systems and Line balancing, Advancement in Manufacturing, Introduction to Robotics, Introduction to Ergonomics.

Industry 4.0 & 3D prototyping- Introduction of Industry 4.0, Industry 4.0 Technologies, Introduction to IoT, introduction to artificial intelligence, 3D printing.

CRITERIA FOR SELECTION TO THE POST OF MASTER SKILL INSTRUCTOR (COMMUNICATION SKILLS)

Section-A **50 Marks**

Domain Knowledge

UNIT-I

The elements of Communication, The importance of communication through English at the present time. The process of communication and factors that influence communication sender, receiver, channel, code, topic, message, context, feedback, noise, filters & barriers, The importance of audience and purpose, The information gap principle: given and new information, information overload, Verbal and non-verbal communication: body language, Comparing general communication and business communication

UNIT-II

The sounds of English, Vowels, diphthongs, consonants, consonant clusters , The International Phonetic Alphabet (IPA): Phonemic transcription, Problem Sounds , Syllable division and word stress , Sentence rhythm and weak forms , Contrastive stress in sentences to highlight different words , Intonation: Falling, rising and falling-rising tones , Varieties of Spoken English: Standard Indian, American and British (Note: This unit should be taught in a simple, non-technical manner, avoiding technical terms as far as possible.)

UNIT- III

Review of English grammar, Static and Dynamic Verbs, the auxiliary system: finite and non-finite verbs, Time, tense and aspect, Voice: Active and passive, Modality, Negation, Interrogation: reported and tag questions, Conditionals, Concord, Phrasal Verbs.

UNIT-IV

Art of Effective communication, Choosing word, Voice, Modulation, Clarity, Time, Simplification of words.

UNIT-V

Technical Communication, Applying soft skills across cultures, Case Studies, Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligence and empathy etc.

ANNEXURE-B

SYLLABUS THE POST OF SKILL IINSTRUCTOR(EVS)

Section-A **100 Marks**

Domain Knowledge

- **UNIT-I** Fundamentals of Environmental Sciences Definition, Principles and Scope of Environmental Science. Structure and composition of atmosphere, hydrosphere, lithosphere and biosphere. Laws of thermodynamics, heat transfer processes, mass and energy transfer across various interfaces, material balance. Meteorological parameters - pressure, temperature, precipitation, humidity, mixing ratio, saturation mixing ratio, radiation and wind velocity, adiabatic lapse rate, environmental lapse rate. Wind roses. Interaction between Earth, Man and Environment. Biogeographic provinces of the world and agro-climatic zones of India. Concept of sustainable development. Natural resources and their assessment. Remote Sensing and GIS: Principles of remote sensing and GIS. Digital image processing and ground trothing. Application of remote sensing and GIS in land cover/land use planning and management (urban sprawling, vegetation study, forestry, natural resource), waste management and climate change. Environmental education and awareness. Environmental ethics.
- **UNIT-II** Environmental Biology Ecology as an inter-disciplinary science. Origin of life and speciation. Human Ecology and Settlement. Ecosystem Structure and functions: Structures - Biotic and Abiotic components. Functions - Energy flow in ecosystems, energy flow models, food chains and food webs. Biogeochemical cycles, Ecological succession. Species diversity, Concept of ecotone, edge effects, ecological habitats and niche. Ecosystem stability and factors affecting stability. Ecosystem services. Basis of Ecosystem classification. Types of Ecosystem: Desert (hot and cold), forest, rangeland, wetlands, lotic, lentic, estuarine (mangrove), Oceanic. Biomes: Concept, classification and distribution. Characteristics of different biomes: Tundra, Taiga, Grassland, Deciduous forest biome, Highland Icy Alpine Biome, Chapparal, Savanna, Tropical Rain forest.
- **Unit-III**: Solid and Hazardous Waste Management Solid Waste - types and sources. Solid waste characteristics, generation rates, solid waste components, proximate and ultimate analyses of solid wastes. Solid waste collection and transportation: container systems - hauled and stationary, layout of collection routes, transfer stations and transportation. Solid waste processing and recovery – Recycling, recovery of materials for recycling and direct manufacture of solid waste products. Electrical energy generation from solid waste (Fuel pellets, Refuse derived fuels), composting and vermicomposting, biomethanation of solid waste. Disposal of solid wastes – sanitary land filling and its management, incineration of solid waste.

- **UNIT-IV** Contemporary Environmental Issues Global Environmental Issues – Biodiversity loss, Climate change, Ozone layer depletion. Sea level rise. International efforts for environmental protection.

- **UNIT-V** Current Environmental Issues in India: Environmental issues related to water resource projects - Narmada dam, Tehri dam, Almatti dam, Cauvery and Mahanadi, Hydro-power projects in Jammu & Kashmir, Himachal and North-Eastern States. Water conservation-development of watersheds, Rain water harvesting and ground water recharge. National river conservation plan – Namami Gange and Yamuna Action Plan. Eutrophication and restoration of lakes. Conservation of wetlands, Ramsar sites in India. Soil erosion, reclamation of degraded land, desertification and its control. Climate change - adaptability, energy security, food security and sustainability. Forest Conservation – Chipko movement, Appiko movement, Silent Valley movement and Gandhamardhan movement. People Biodiversity register. Wild life conservation projects: Project tiger, Project Elephant, Crocodile.

SYLLABUS FOR THE POST OF SKILL INSTRUCTOR (HOSPITALITY)

Section-A **100 Marks**

Domain Knowledge

- **UNIT-I: Hospitality Management;** Introduction, Hospitality Industry – services offered, Factors influencing operation of establishments, Personal attributes required, Key Departments & Services. Methods of Cooking, Fuels Used, Food Hazards and Risks, Departmental Organization and Staffing, Necessary Food Certifications and Licenses Such as FSSAI etc., Non Alcoholic Beverages, Knowledge of Kitchen & Services, Ingredients and Equipment's, Procurement of Raw Material, Methods of Purchase, Storage-Dry and Cold, Cost Control, Food Costs, Sales Control, Food Safety & Quality, Menu Planning, Knowledge of Food (Indian, Chinese and Continental-Basic Recipes), Nutritional Value of Food, Safety & Security, Food Service Methods, Types of Services, Restaurant & Buffet layouts,
- **UNIT-II: Front Office Communication and other Attributes;** Handling reservations requests: Explaining tariffs, promotional packages and facilities, clarifying details and confirming, understanding of the details, Determining correct room rates: Recording special requests, wait listing and over booking policies and procedures, cancellations and alterations to reservations, checking guest histories, processing no shows, Recording reservations: Reservation forms/charts, information to other departments on special requests and arrangements; Guest black list filing and retrieving of information; Use of emails, faxes, telephones, computers and other aids to facilitate the work, Types of reservation systems: Manual-conventional reservations, charts, forecast board, density charts, computerised systems, Guest departure procedures:
- **UNIT-III**: **HOUSE KEEPING SERVICE & MAINTENANCE;** Brief history of housekeeping, classification of various institutions, inter departmental coordination, organizational charts of housekeeping department, their duties, responsibilities, methods, frequency and schedules, usage of equipment, functions, storage & care, work cards, functions, formation & plan of work, Physical features & importance of linen room; Layout and plan of a linen room; Bed, bath & table linen – types & sizes, Beds & pillows, bedding requirements, shapes, sizes and types of mattresses, bed spreads mattress protectors, Linen inventory procedure – various forms to be discussed and tracing of linen to be maintained in a register or in a computerised environment ;Selection, purchase, distribution, control of linen with relevant records Staff uniform – characteristics, distribution, care & maintenance & control, Cleaning bathroom fittings and fixtures.
- **UNIT-IV: Distribution Channel;** Meaning and definition of hospitality distribution channels, functions and levels of distribution channels, basics of major hospitality distribution channels-travel agents, tour operators, consortia and reservation system.

- **UNIT-V: Guest Safety and Security;** Safety practices & procedures- Accidents, types, nature, classification, Preventive measures for each type of accident, reporting accidents, first aid - meaning, importance, and basic rules. Fire Prevention.

SYLLABUS FOR THE POST OF SKILL INSTRUCTOR (WELLNESS MANAGEMENT)

Section-A **100 Marks**

Domain Knowledge

Unit I: Concept of Fitness and Wellness and their significance in Modern times, Holistic approach to management of health and fitness including diet and exercise (Aerobic and anaerobic); Scope of Fitness Trainer and Health and Fitness Component, Alternative Systems for Health and Fitness; Effect of anaerobic exercise on musculoskeletal system, Endurance, Strength/Power, Speed, Coordination, Agility and Balance

Unit II: Physical Screening and General Principles of Training; Health Screening-Health Conditions that affect by the Physical Activity and Medication, Training consideration while selecting nature of exercise and Understanding suitability and forms of exercise for fitness, Client Preferences, Expectations and Life Style information and Code of Ethics; Professional Responsibilities of a fitness trainer towards clients

Unit III: Introduction of Cardio-respiratory System and Assessment of Cardio-respiratory fitness using Maximum aerobic capacity (VO2 max), Types of exercise: Calisthenics, Aerobics and Dance, Weight Training, Yoga and Other forms of Exercise;

Unit IV: Introduction of Water and Electrolyte Balance, Regime of hydration and dehydration and Sports Drink, Nutrition- Caloric Consumption, Weight variation due to dietary habit, Physiological and Metabolic changes during exercise; Recommended nutritional intakes, Dietary guidelines and Nutrient needs for people with different life style and Sport.

Unit V: Establishment and management of fitness centre, legal issues and partnership consisting of the following lectures Procurement of Equipments and their maintenance in Personal Management and Legal Responsibilities, Facilities, Equipments, Supervision, Instruction and Safety Guidelines.

SYLLABUS FOR THE POST OF SKILL INSTRUCTOR (MLT)

Section-A **100 Marks**

Domain Knowledge

Unit-I: Health Education; Introduction to Health, Health providers, Health Care Delivery System, Health Problems, Wellness, Ageing and FirstAid.

Fundamentals of Medical Laboratory, Instruments & Reagents; Introduction to Laboratory, Code of conduct of medical laboratory personnel, Organization of clinical laboratory and role of medical laboratory technician, Safety measures, Professional Ethics.

Unit- II: Medical Biochemistry; Chemistry of Lipids, Introduction of Enzymes, Vitamins, Diabetes, Photcolorimeter.

Fundamentals of Microbiology; General characters and classification of Bacteria, Growth and Maintenance of Microbes, Sterilization and Disinfection, Culture Media.

Diagnostic Biochemistry; Diabetic Profile and Liver Function Test, Renal and Pancreatic Function Test, Cardiac Function Test, Gastric Function Test, Acid Base Balance.

Unit-III: Clinical Endocrinology and Tumor; Hormones, Thyroid Function, Infertility, Growth Hormones, Tumor Markers.

Unit-IV: Basic Haematology; Composition of blood and its functions, Origin, Development, and morphology of Blood cells, Basic concepts of Anaemia, Leukaemia, and hemorrhagic disorder, Normal Cell, Cell Injury- types of cell injury, etiology of cell injury, morphology of cell injury, cellular swelling, Cell death : types- autolysis, necrosis, apoptosis & gangrene, Cellular adaptations-atrophy, hypertrophy, hyperplasia & dysplasia.

Blood banking & Immunohaematology; Methods of estimation of Haemoglobin, Methods of determination of PCV, Blood Group- methods of grouping and ungrouping, Blood transfusion and hazards, Testing Donor Blood, Blood Donor Records, Storage & Transport, Storage & Transport.

Unit-V: Clinical Pathology (body fluids) and Parasitological; Reception of Patients, The Microscope- Types, Parts, Cleaning, and Care, Examination of Urine, Examination of Body Fluids, Clinical Biochemistry Definition of Antigen and Antibody, Clinical Enzymology, Disorders of Carbohydrates, Nutritional Disorders, Liver function test

Immunology; Antigens and Antibodies, Types of Antigens, Inflammation, Haemodynamic Disorders: Oedema, hyperemia, congestion, haemorrage, circulatory disturbances, thrombosis, ischaemia & infarction.

SYLLABUS FOR TO THE POST OF SKILL INSTRUCTOR (AGRICULTURE)

Section-A **100 Marks**

Domain Knowledge

- **UNIT-I Farm Machinery:** Machine Design: Design and selection of machine elements – gears, pulleys, chains and sprockets and belts; overload safety devices used in farm machinery; measurement of force, stress, torque, speed, displacement and acceleration on machine elements - shafts, couplings, keys, bearings and knuckle joints, Soil tillage; forces acting on a tillage tool; hitch systems and hitching of tillage implements; functional requirements, principles of working, construction and operation of manual, animal and power operated equipment for tillage, sowing, planting, fertilizer application, inter-cultivation, spraying, mowing, chaff cutting, harvesting and threshing calculation of performance parameters - field capacity, efficiency, application rate and losses; cost analysis of implements and tractors.
- **UNIT-II: Sectoral composition of Indian Economy & External Sector in India:** Issues in Agriculture sector in India, land reforms Green Revolution and agriculture policies of India, India's foreign trade value composition and direction, India Balance of payment since 1991, FDI in India, Impact of Globalization on Indian Economy, WTO and India.
- **UNIT-III: Agricultural Meteorology**: Different meteorological variables related to agriculture, Rainfall- Hydrologic cycle and it's components, Types and forms of precipitation, Humidity, definition, windvane, Anemo-meter, Indian Agro Climatic Zones Elementary idea of weather forecasting, etc.
- **UNIT-IV: Principles of Crop Production:** Definition and scope of Agronomy, Classification of Crops on Different basis, General principles of Crop production : Climate, soil and its preparation, seed and seed sowing, post-sowing tillage, water management, nutrition, plant protection measures, harvesting, threshing and storage, Crop sequences and systems with emphasis on mixed cropping and inter cropping, etc.
- **UNIT-V: Introduction to Plant Biotechnology:** Definition scope and importance of plant biotechnology, Plant tissue culture, Cloning vectors for recombinant DNA, Application of plant genetic engineering in crop improvement, etc.

  Principles of Plant Breeding: Plant Breeding-history, objectives and scope, Mode of reproduction in crop plants in relation to breeding techniques, Plant variation kind and causes, Genetic consequences of self and cross pollinated crops, etc.

SYLLABUS FOR THE POST OF SENIOR SKILL INSTRUCTOR (HOSPITALITY)

Section-A **100 Marks**

Domain Knowledge

- **UNIT-I: Hospitality Management;** Introduction, Hospitality Industry – services offered, Factors influencing operation of establishments, Personal attributes required, Key Departments & Services. Methods of Cooking, Fuels Used, Food Hazards and Risks, Departmental Organization and Staffing, Necessary Food Certifications and Licenses Such as FSSAI etc., Non Alcoholic Beverages, Knowledge of Kitchen & Services, Ingredients and Equipment's, Procurement of Raw Material, Methods of Purchase, Storage-Dry and Cold, Cost Control, Food Costs, Sales Control, Food Safety & Quality, Menu Planning, Knowledge of Food (Indian, Chinese and Continental-Basic Recipes), Nutritional Value of Food, Safety & Security, Food Service Methods, Types of Services, Restaurant & Buffet layouts
- **UNIT-II: Front Office Communication and other Attributes;** Handling reservations requests: Explaining tariffs, promotional packages and facilities, clarifying details and confirming, understanding of the details, Determining correct room rates: Recording special requests, wait listing and over booking policies and procedures, cancellations and alterations to reservations, checking guest histories, processing no shows, Recording reservations: Reservation forms/charts, information to other departments on special requests and arrangements; Guest black list filing and retrieving of information; Use of emails, faxes, telephones, computers and other aids to facilitate the work, Types of reservation systems: Manual-conventional reservations, charts, forecast board, density charts, computerised systems,Guest departure procedures:
- **UNIT-III**: **HOUSE KEEPING SERVICE & MAINTENANCE;** Brief history of housekeeping, classification of various institutions, inter departmental coordination, organizational charts of housekeeping department, their duties, responsibilities, methods, frequency and schedules, usage of equipment, functions, storage & care, work cards, functions, formation & plan of work,Physical features & importance of linen room; Layout and plan of a linen room; Bed, bath & table linen – types & sizes, Beds & pillows, bedding requirements, shapes, sizes and types of mattresses, bed spreads mattress protectors, Linen inventory procedure – various forms to be discussed and tracing of linen to be maintained in a register or in a computerised environment ;Selection, purchase, distribution, control of linen with relevant records Staff uniform – characteristics, distribution, care & maintenance & control, Cleaning bathroom fittings and fixtures.
- **UNIT-IV: Distribution Channel;** Meaning and definition of hospitality distribution channels, functions and levels of distribution channels, basics of major hospitality distribution channels-travel agents, tour operators, consortia and reservation system.

- **UNIT-V: Guest Safety and Security;** Safety practices & procedures- Accidents, types, nature, classification, Preventive measures for each type of accident, reporting accidents, first aid - meaning, importance, and basic rules. Fire Prevention.

SYLLABUS FOR THE POST OF SENIOR SKILL INSTRUCTOR (PSYCHOLOGY)

Section-A **100 Marks**

Domain Knowledge

UNIT-I: Psychology as a science; Definition of Psychology , Historic development of the definition of Psychology, Psychology as a Behavioral Science, Goals of Psychology, Nature of Psychology as a Science, Scope of General Psychology, Broad fields of Psychology

UNIT-II: Physiological Psychology; - Introduction to Physiological Psychology, Meaning of Physiological psychology, Discussion of Mentally and Physical Relation, Nature & Scope of Physiological Psychology, Internal Environment of Body, Introduction of Internal Environment of Body, Metabolism, Enzymes, Vitamins, Hormones, Genes, Neuron Cell, Meaning of Neuron Cell – Structure and Function, nerve Impulse, Nervous Systems, Central Nervous System (CNS), Cerebellum Structure and Function, Cerebrum Structure and Function, thalamus & hypothalamus, spinal Cord, Peripheral Nervous System (PNS), Somatic Nervous System, Autonomic Nervous System, Sensory Mechanisms, Motor Mechanism, Physical bases of Perception, Motivation, Emotion (Lie detection), Adoptive Behavior, Electroencephalograph, Evoked potentials.

UNIT-III: Systems and Theory of Personality; – Gestaltism, Meaning, Principal of Gestalt Psychology, Laws of Organization in Perception, Contribution of Wertheimer, Kohler, Koffka, Filed Theory, Filed Theory and Life Space Theory, contribution of Kurt Lewin, Psycho-Analysis-I, Basic Introduction of Psycho Analysis, Principal of Psycho-Analysis (Sigmand Frued) Psycho-Analysis-II , Adler's Individual Psychology, Principals of Psycho-Analysis by Adler, Jung's Analytical Psychology, Contribution of Alder and Jung in Psychology, Hormic Psychology, Introduction of Purposivism, Theory of Medougall.

UNIT-IV: Criminal Psychology; - Meaning of Crime Psychology, Nature of Crime Psychology, Types of Crime Psychology, Scope of Crime Psychology, Theory of Crime, Economical Theories, Political Theories, Sociological Theories, Psychological Theories, Reason of Crime – Economic, Political, Sociological Psychological, Juvenile Crime, Meaning of Juvenile Crime and Causes of Juvenile Crime – [1]Social [2] Psychological [3] Economics, Prevention of Crime, model of Crime Prevention

Psychological tests- Definition and Uses of Psychological Testing, Characteristics of a Good Psychological Test, Kinds (Types) of Test, Intelligence Tests,

UNIT-V: Child Psychology Introduction; definition, and Nature of Child Psychology, Scope of Child psychology, importance of Child Psychology, Method of Child Psychology, Observation, Event Note, autobiography, Growths and Development, Meaning of growth and development, Characteristics of growth and development, Disciplines and Authority, Meaning of Discipline and Authority, Various nature of Home Authority, Characteristics of good, Cognitive Psychology - Definition and Nature, Scope & Methods, Important of Cognitive process, Theory of Cognitive Psychology, Contemplation and Problem Solve, Definition, Nature types of Cognitive Lesson, self-Contemplation, Realest, Meaning, nature

of problems solving, Method aim care of problem solving, The Concept and Memory, Nature and Important of Concept, Type of Concept, Meaning and Steps of Memory, Type of Memory, Creative and logic, definition nature of Creative, Steps of Creativity, Meaning, nature of logic, Types of Logic, Decision making process, difference of Decision making, Self-research in decision making, Bias and error in decision making.

SYLLABUS FOR THE POST OF SENIOR SKILL INSTRUCTOR (MLT)

Section-A **100 Marks**

Domain Knowledge

Unit-I: Health Education; Introduction to Health, Health providers, Health Care Delivery System, Health Problems, Wellness, Ageing and FirstAid.

Fundamentals of Medical Laboratory, Instruments & Reagents; Introduction to Laboratory, Code of conduct of medical laboratory personnel, Organization of clinical laboratory and role of medical laboratory technician, Safety measures, Professional Ethics.

Unit- II: Medical Biochemistry; Chemistry of Lipids, Introduction of Enzymes, Vitamins, Diabetes, Photcolorimeter.

Fundamentals of Microbiology; General characters and classification of Bacteria, Growth and Maintenance of Microbes, Sterilization and Disinfection, Culture Media.

Diagnostic Biochemistry; Diabetic Profile and Liver Function Test, Renal and Pancreatic Function Test, Cardiac Function Test, Gastric Function Test, Acid Base Balance.

Unit-III: Clinical Endocrinology and Tumor; Hormones, Thyroid Function, Infertility, Growth Hormones, Tumor Markers.

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Immunology; Antigens and Antibodies, Types of Antigens, Inflammation, Haemodynamic Disorders: Oedema, hyperemia, congestion, haemorrage, circulatory disturbances, thrombosis, ischaemia & infarction.