SHRI VISHWAKARMA SKILL UNIVERSITY
(State University enacted under the Government of Haryana Act 25, 2016)

Syllabus of written test for the post of Skill Instructors in different subjects against Advertisement No. SVSU/2026/Estt./SI/T-37 to T- 57/2026.

Instructions:

1. The question paper will consist of 50 questions with each question carrying 01 (one) mark.
2. The total time allowed to attempt the question paper will be 75 minutes.
3. There will be negative marking, and 0.25 mark shall be deducted for each incorrect answer.

SHRI VISHWAKARMA SKILL UNIVERSITY
(State University enacted under the Government of Haryana Act 25, 2016)
Plot No. 147, Sector 44, Gurugram (Haryana) 122003, Email: info@svsu.ac.in

SKILL INSTRUCTOR (AGRICULTURE)

Unit I: Agronomy and Soil Science

Fundamentals, scope and development of agriculture; agricultural research institutes; principles of agronomy; crop classification, seed and seed multiplication; crop growth, tillage, soil fertility and productivity; manures and fertilizers; cropping patterns and farming systems. Production technology of major Kharif, Rabi, cash and fodder crops, including rice, wheat, maize, barley, pulses, oilseeds, cotton and sugarcane. Fundamentals of soil science: soil formation, rocks and minerals, weathering, soil profile, physical and chemical properties, soil water, air, temperature, soil organic matter and soil organisms.

Unit II: Entomology and Plant Pathology

Distribution, biology, symptoms, nature of damage and management of insect and non-insect pests of field, vegetable, fruit, plantation and ornamental crops; stored grain pests and their management. Economic importance, symptoms, causes, epidemiology, disease cycle and integrated management of major plant diseases. Principles of plant pathology; plant pathogens and their life cycles; principles of disease management, disease forecasting and biotechnology in plant protection.

Unit III: Agricultural Extension Education

Meaning, scope and concepts of extension education; rural development and major development programmes in India; agricultural technology transfer; communication process and models; adoption and diffusion of innovations; extension teaching methods; programme planning; ICT applications in agriculture; training and capacity building of farmers and extension personnel.

Unit IV: Genetics and Plant Breeding

Floral biology, emasculation and pollination techniques; modes of reproduction and pollination; self- and cross-pollinated crops; introduction and acclimatization; selection methods and pure-line theory; hybridization and handling of segregating generations; pedigree, bulk and backcross methods; incompatibility and male sterility; heterosis and inbreeding depression; recurrent selection, synthetics and composites; mutation breeding, polyploidy breeding and wide hybridization.

Unit V: Horticulture and Vegetables

Importance, status and classification of horticultural crops; fruit zones; dormancy, chilling requirement, heat units, juvenility, flowering and fruit development; parthenocarpy and unfruitfulness; abiotic stress management; propagation structures and greenhouses; orchard planning, layout and management. Production technology of major tropical, subtropical and temperate fruits, including mango, citrus, guava, apple, grapes, banana and papaya. Importance of vegetables in human nutrition; vegetable production systems; varieties, sowing time, seed rate and cultivation practices of major vegetable crops, including potato, tomato, brinjal, chilli, cauliflower, peas, onion, garlic, carrot, radish and cucurbits

Syllabus for Animation.

Unit 1- Design & Visual Communication

Fundamentals of Design – Meaning and importance of design, introduction to visual communication, purpose and applications of design, elements of design (point, line, shape, form, space, colour, texture, value, tone, size and scale), principles of design (balance, contrast, emphasis, hierarchy, proportion, rhythm, repetition, pattern, movement, unity, harmony, variety, alignment and proximity).

Colour, Composition and Perception – Fundamentals of colour theory, colour wheel, primary, secondary and tertiary colours, warm and cool colours, colour schemes, Modde of Colour, Mood of Colour & colour psychology, Composition & Types of Composition, Gestalt principles

Typography and Layout Design – Introduction to typography, typeface and font classification, serif, sans serif, script and display typefaces, anatomy of type, kerning, tracking, leading, typographic hierarchy, text alignment, readability, layout principles, image-text relationship, page composition and visual balance.

Applications of Design – Graphic design and communication, logo and identity design, poster and banner design, brochure and flyer design, advertising and promotional design, packaging design, editorial and publication design, digital and social media design, print design and production basics, branding and visual identity.

Unit 2- Fundamentals of Animation

Introduction and History of Animation – Meaning and concept of animation, history and evolution of animation, persistence of vision, apparent motion, early animation devices (Thaumatrope, Phenakistoscope, Zoetrope, Praxinoscope, Flipbook and Zoopraxiscope), development of traditional animation, history of Indian animation, animation pioneers and studios, types of animation (traditional, digital 2D, 3D, stop-motion, cut-out, rotoscoping, motion graphics and experimental animation).

Principles of Animation – Squash and stretch, anticipation, staging, straight-ahead action, pose-to-pose animation, follow-through and overlapping action, slow in and slow out, arcs, secondary action, timing and spacing, exaggeration, solid drawing and appeal.

Animation Techniques and Production – Frames and frame rate, keyframes and in-between frames, exposure sheets and dope sheets, animation timing charts, character movement and body mechanics, walk cycles, run cycles, facial expressions and emotions, lip-sync and dialogue animation, animation layout, scene planning and animation production pipeline.

Animation Tools and Applications – Traditional animation tools and materials, digital animation software, animation layers, keyframe-based animation, backgrounds and scene composition, character design and model sheets, animation cleanup and in-betweening, rendering and exporting animation, applications of animation in film, television, advertising, games, education and digital media.

Unit-3 Adobe Creative Suite

Adobe Creative Suite and Computer Graphics – Introduction to Adobe Creative Suite and its applications, overview of Adobe software, fundamentals of computer graphics, raster and vector graphics, differences between raster and vector graphics, pixels and image resolution, image dimensions and aspect ratio, colour theory and colour modes (RGB, CMYK, Grayscale and Bitmap), file formats (PSD, AI, EPS, SVG, PDF, JPEG, PNG, TIFF and GIF), software installation and workspace basics, interface elements, menus, panels, toolbars, document setup, artboards, canvas, layers and file management.

Adobe Illustrator and Adobe Photoshop – Introduction to Adobe Illustrator and vector graphics, Illustrator interface and workspace, artboards, selection tools, direct selection tools, shape tools, Pen Tool, Bézier curves, anchor points, direction handles, Pencil Tool, Brush Tools, path editing, Pathfinder operations, Shape Builder Tool, fill and stroke, colour picker, swatches, gradients, layers, alignment, typography, text on a path, clipping masks, logo design, icon design, vector illustration and image tracing. Introduction to Adobe Photoshop and raster graphics, Photoshop interface and workspace, document setup, selection tools (Marquee, Lasso, Quick Selection and Magic Wand), Move Tool, Crop Tool, Brush Tool, Eraser Tool, Clone Stamp Tool, Healing Tools, layers and layer management, layer masks, blending modes, adjustment layers, colour correction, retouching, background removal, image manipulation, photo compositing, typography, filters, poster design and social media graphics.

Adobe InDesign and Adobe Animate – Introduction to Adobe InDesign and desktop publishing, InDesign interface and workspace, document setup, page layout, margins, columns, rulers and guides, master pages and parent pages, page management, frames and objects, text frames, importing and formatting text, character and paragraph styles, typography, kerning, tracking and leading, paragraph alignment, image placement, linking and embedding images, object arrangement, colour swatches, grid systems, multi-page document design, brochure design, magazine layout, newsletter design, book design, preflight, packaging and print-ready PDF export. Introduction to Adobe Animate and 2D digital animation, Animate interface and workspace, stage and timeline, frames, keyframes and blank keyframes, frame rate, layers and layer management, drawing tools, shape tools, brush tools, symbols (Graphic, Button and Movie Clip), motion tweening, shape tweening, classic tweening, frame-by-frame animation, onion skinning, motion paths, masking, character animation, basic walk cycles, sound integration, animation testing and publishing.

Adobe After Effects and Motion Graphics – Introduction to Adobe After Effects, applications of motion graphics and visual effects, After Effects interface and workspace, project panel, composition settings, timeline and layer management, importing and organizing media, transform properties (position, scale, rotation, anchor point and opacity), keyframes and animation, interpolation and easing, Graph Editor, shape layers, text animation and kinetic typography, masks and track mattes, parenting and pre-compositions, blending modes, effects and presets, motion paths, motion tracking, camera animation, 2.5D animation, green screen and chroma keying, rotoscoping, visual effects, particle effects, compositing, logo animation, title sequences, animated infographics, explainer videos, audio synchronization, rendering, export settings and output formats.

Unit-4 Media & Communication

Fundamentals of Media and Communication – Meaning and definition of communication, nature, scope and importance of communication, elements of communication, communication process and models, types of communication (verbal, non-verbal, written, visual, interpersonal and mass communication), barriers to communication, introduction to media, types of media, introduction to multimedia, elements of multimedia (text, graphics, audio, video and animation), role of multimedia in content creation and digital communication.

Types of Media and Content – Print media, broadcast media, digital and social media, traditional and new media, types of media content (textual, visual, audio, video, interactive and multimedia content), audience and media consumption, media platforms, distribution channels and introduction to advertising media.

Visual Communication and Media Production – Fundamentals of visual communication, images, symbols and signs in communication, visual storytelling, graphic design in media, photography and photojournalism, audio and video production, scriptwriting, storyboarding, advertising and promotional communication, news, entertainment and educational media, media planning and content distribution.

Digital Media and Ethics – Social media platforms and applications, digital content creation, online advertising, digital marketing, audience engagement, feedback, media literacy, critical thinking, copyright, intellectual property, media ethics, responsible communication, misinformation, disinformation, fake news, digital privacy, online safety and emerging trends in media and communication.

Unit-5 2D Animation

Foundations of 2D Animation – Introduction to 2D animation, traditional and digital 2D animation, principles of animation and their applications, frames, frame rate and exposure,

keyframes, breakdowns and in-between frames, timing, spacing, animation charts, drawing fundamentals, line of action, gesture drawing, character proportions and silhouette.

Character and Movement Animation – Character design, character sheets, model sheets, turnaround sheets, facial expressions, emotion sheets, walk cycle animation, run cycle animation, jump animation, weight, balance, body mechanics, anticipation, follow-through, facial animation, lip-sync, acting, character performance, secondary motion and overlapping action.

Digital 2D Animation Workflow – Introduction to 2D animation software, timeline and frame management, keyframe and onion-skin techniques, layers and scene organization, drawing and brush tools, pegs, pivots and transform controls, cut-out animation, puppet animation, frame-by-frame animation, background design, scene layout, cleanup, inking and colouring.

2D Animation Production – Concept development, character planning, script development, storyboard development, animatics, scene timing, backgrounds, props, layouts, character animation, scene assembly, sound effects, dialogue, synchronization, compositing, final scene assembly, rendering, export settings, animation quality control and short animation film production.

Unit-6 Motion Graphics

Introduction to Motion Graphics – Meaning, definition and scope of motion graphics, motion graphics and traditional animation, elements of motion graphics, design principles, typography in motion, shape, colour and graphic elements, visual hierarchy, composition, motion design styles and trends.

Animation and Motion Techniques – Keyframes, timeline animation, position, scale, rotation, opacity, timing, spacing, easing, Graph Editor, motion curves, parent-child relationships, anchor points, shape layer animation, text animation, masking, track mattes, path animation, motion paths, looping and repeating animation.

Effects and Compositing – Introduction to Adobe After Effects, layers, pre-compositions and nesting, masks, rotoscoping, track mattes, blending modes, effects and presets, motion tracking, stabilization, green screen, chroma keying, camera animation.

Motion Graphics Production – Storyboarding, animatics, timing planning, logo animation, brand reveals, animated infographics, data visualization, title sequences, kinetic typography, explainer videos, broadcast graphics, news packages, social media motion design, audio synchronization, sound design, rendering, export and delivery formats.

Unit-7 3D Modeling and Texturing

Introduction to 3D Graphics – Introduction to 3D computer graphics, applications of 3D modeling, 3D coordinate systems and axes, vertices, edges and faces, polygonal modeling fundamentals, object mode, edit mode, 3D viewport and navigation, introduction to Blender, Autodesk Maya and 3ds Max, object transformations (move, rotate and scale).

3D Modeling Techniques – Primitive objects, basic modeling, extrusion, inset, bevel, loop cuts, subdivision surface modeling, edge loops, topology, mirror modeling, array modeling, Boolean modeling, hard-surface modeling, organic modeling, sculpting, character modeling, environment modeling, low-poly modeling, high-poly modeling, retopology and mesh optimization.

UV Mapping, Materials and Texturing – Introduction to materials and shaders, material properties and assignment, diffuse, metallic, roughness and specular properties, texture types- diffuse, base colour, normal, bump, roughness, opacity and displacement maps, texture coordinates, procedural textures, image-based texturing, texture painting.

Lighting, Rendering and Output – Fundamentals of 3D lighting, types of lights, three-point lighting, camera setup and composition, environment and HDRI lighting, rendering engines, rasterization, ray tracing, rendering settings, sampling, render passes, basic compositing, turntable rendering, product visualization, render optimization and output formats.

Unit-8 Video Editing

Introduction to Video Editing – Meaning, definition and importance of video editing, history and evolution of video editing, linear and non-linear editing, video editing workflow, introduction to editing software, video formats, containers, resolution, aspect ratio, frame rate, video compression.

Editing Tools and Techniques – Timeline and track management, importing and organizing media, source monitor, program monitor, cutting, trimming, splitting clips, insert editing, overwrite editing, ripple editing, roll editing, slip editing, slide editing, transitions, continuity editing.

Audio, Colour and Visual Effects – Audio editing and synchronization, dialogue, music and sound effects, audio levels and mixing, noise reduction, audio enhancement, colour correction, colour grading, white balance, exposure correction, Lumetri tools, titles, captions, lower thirds, chroma keying, green screen, masks, tracking, stabilization, time remapping, compositing and visual effects.

Storytelling and Video Production – Editing for narrative and storytelling, shot types, camera angles, camera movements, continuity, match cuts, montage, rhythm, pacing, emotional impact,

script and storyboard interpretation, documentary editing, advertisement editing, promotional video editing, social media video editing, export settings and delivery specifications.

Unit-9 AI in Design

Introduction to Artificial Intelligence – Meaning and definition of artificial intelligence, history and evolution of AI, types of AI, introduction to machine learning and deep learning, AI in creative industries, generative AI, AI models for text, image, audio and video, human intelligence and artificial intelligence.

AI Tools for Graphic and Digital Design – AI-assisted graphic design, text-to-image generation, image-to-image generation, prompt engineering for visual design, AI-assisted ideation, mood boards, AI image editing, generative fill, background removal, image enhancement, AI-assisted typography, layout design, logo concepts, branding, illustration, concept art and creative software integration.

AI in Animation, Video and 3D – AI-assisted story and script development, AI-generated storyboards, concept frames, image-to-video generation, text-to-video generation, AI-assisted 2D animation, character design, voice generation, lip-sync, AI-assisted video editing, motion capture, pose estimation, 3D modeling, texturing, visual effects, compositing, audio and sound design.

Ethics, Limitations and Future Applications – Human-AI creative collaboration, benefits and limitations of AI in design, copyright, intellectual property, authorship, ownership of AI-generated work, bias and representation, privacy, data protection, deepfakes, synthetic media, ethical use of AI, content verification, quality control, future of design careers, AI in creative education, industry workflows, responsible AI use and disclosure.

Unit-10: Photography, Digital Imaging and Visual Storytelling

Fundamentals of Photography – Introduction to photography, history and evolution of photography, types and genres of photography, camera types and components, camera sensors, lenses and focal lengths, aperture, shutter speed, ISO, exposure triangle, depth of field, focus and white balance.

Composition and Visual Techniques – Rule of thirds, symmetry, balance, leading lines, framing, perspective, patterns and repetition, foreground and background, negative space, camera angles, camera shots, camera movements, visual hierarchy, composition techniques and photographic storytelling.

Lighting and Image Making – Natural and artificial lighting, types of lighting, hard and soft light, key light, fill light, backlight, three-point lighting, studio lighting, outdoor photography, portrait

lighting, product photography, still-life photography, silhouette photography, shadow and reflection techniques.

Digital Imaging and Photography Applications – Digital image formats, image resolution, image processing, colour correction, photo retouching, image enhancement, photo manipulation, photojournalism, commercial photography, advertising photography, product photography, documentary photography.

SKILL INSTRUCTOR (CHEMISTRY)

Unit I – Inorganic Chemistry

Atomic structure and periodic properties.
Chemical bonding: ionic, covalent, coordinate and metallic bonding.
Molecular orbital theory and hybridisation.
Coordination compounds: nomenclature, isomerism and bonding theories.
Crystal field theory and magnetic properties.
Transition and inner-transition elements.
Acids, bases, oxidation-reduction reactions.
Organometallic compounds and bioinorganic chemistry.

Unit II – Organic Chemistry

Basic concepts of organic chemistry and reaction mechanisms.
Isomerism: structural and stereoisomerism.
Alkanes, alkenes, alkynes and aromatic compounds.
Electrophilic and nucleophilic substitution reactions.
Alcohols, phenols, ethers, aldehydes and ketones.
Carboxylic acids and their derivatives.
Amines, diazonium salts and heterocyclic compounds.
Biomolecules: carbohydrates, proteins, lipids and nucleic acids.
Polymer chemistry and synthetic polymers.

Unit III – Physical Chemistry

Gaseous and liquid states.
Thermodynamics and thermochemistry.
Chemical and ionic equilibrium.
Chemical kinetics and reaction order.
Electrochemistry and conductance.
Solutions and colligative properties.
Phase rule and phase equilibrium.
Quantum chemistry and atomic spectra.
Photochemistry and surface chemistry.

Unit IV – Analytical Chemistry

Qualitative and quantitative chemical analysis.
Volumetric analysis and titrimetric methods.
Gravimetric analysis.
Acid-base, redox and complexometric titrations.
pH measurement and buffer solutions.
UV-Visible spectroscopy.
IR and NMR spectroscopy.
Chromatographic techniques: TLC, HPLC and GC.
Potentiometry and conductometry.
Error analysis and statistical treatment of experimental data.

Unit V – Industrial and Applied Chemistry

Industrial preparation of acids, alkalis and fertilizers.
Water treatment and water quality analysis.
Corrosion and its prevention.
Fuels, combustion and lubricants.
Cement, glass and ceramic industries.
Petrochemicals and polymer industries.
Green chemistry and sustainable chemical processes.
Environmental pollution and its chemical analysis.
Pharmaceutical and food chemistry.

SKILL INSTRUCTOR (COMMUNICATION SKILL)

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.

SKILL INSTRUCTOR (CSE/IT)

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, Structures, ~~files,~~ pointers and file handling.

Basics of C++: 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 members of a class, data & function members. 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. 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.

Python & Scripting: Python fundamentals, data structures (lists, tuples, dictionaries, sets), control structures, functions, file handling, scientific and data libraries (NumPy, Pandas), and basic Linux shell scripting.

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.

Algorithms & Complexity: 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 Lifetime & 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 & Software Engineering Tools: Overview of operating systems, functionalities and characteristics 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/Linux process control and management, PCB, signals, forks and pipes, basic Linux administration. 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 replacement 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. **Software Engineering & DevOps Basics:** SDLC, Agile/Scrum methodologies, software testing basics, Version Control (Git & GitHub), and introductory containerization (Docker).

Unit-E

Databases (RDBMS & NoSQL): 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 and Modern NoSQL databases (MongoDB, key-value and document stores).

Computer Networks, Web Technologies, Cloud & AI Fundamentals: 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, DHCP, SMTP, POP, FTP, HTTP/HTTPS). Basics of Wi-Fi. Network security: authentication, basics of public key and private key cryptography, digital signatures and certificates, firewalls, and cybersecurity hygiene. **Web Technologies:** HTML5, CSS3, JavaScript (ES6+), DOM manipulation, RESTful APIs, JSON, and basics of a modern frontend/backend framework (e.g., React or Node.js). **Cloud & AI Fundamentals:** Cloud computing models (IaaS, PaaS, SaaS), virtualization basics, and foundational concepts of AI and Machine Learning.

SKILL INSTRUCTOR (ELECTRONICS)

- **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.

Subject: Fine Arts

The visual arts consist of creative expression that considers innovation and individuality as its primary determinants. Objects-of-art thus produced with great skill or accomplishment invariably gains a degree of invested value that is culturally significant, which is why visual art has also been known as fine arts. A range of disciplinary specialization in studio-practice has led to sub-categories like drawing, painting, sculpture, printmaking, design etc. which are also medium specific categories within practice. In contemporary times visual art has moved beyond the singular discipline towards multi-media expressions that have even significantly transgressed the studio and gallery/museum as spaces and the market as its economic determinant. Thus, it now includes and incorporates the applied arts within it, while photography and digital modes are integrated into its world of postmodern practice. On the theoretical perspective, art history and criticism examines and analyses the past and present developments and innovations, providing a contextual awareness to studio-practice about the present and possible future(s). This syllabus thus integrates all of the above into a holistic understanding of the discipline(s).

Scheme of Syllabus

UNIT:-I

Fundamentals of visual art (line, shape, form, space, colour, texture, tonal values, perspective, design etc.). Understanding visual principles of composition (proportion, unity, harmony, rhythm, contrast, balance, foreshortening and emphasis etc.). Representation through two and three dimensions in visual art. Environmental, conceptual and perceptual aspects of art.

UNIT:-II

Various forms of visual arts and their inter-relationship with other modes of creative expression, e.g. performing art, cinema and literature.

UNIT:-III

Knowledge of traditional medium, materials and techniques, and their application in all disciplines of visual expression – e.g. carving and casting processes; handling of

colour/pigment (impasto, glazing, etc.); intaglio/relief print; fresco; preparation of ground for murals, preparation of *wasli* for miniatures, etc.

UNIT:-IV

Developments in modern techniques, processes and procedures and their application in contemporary visual practices (installation; multi-colour print; computer-aided design – vector & rector; multimedia and digital technologies in art; *trompe l'oeil* illusory hyper-realism etc.)

UNIT:-V

The study of Indian and Western aesthetics and art appreciation.

UNIT:-VI

Study of chronological periods from prehistory to post-modern art and artists of the West, with a focus on the various movements that transformed its history

UNIT:-VII

Study of chronological periods and developments in Indian art from prehistory to the 19th century.

UNIT:-VIII

Contemporary practices in Indian art during the 20th & 21st centuries with reference to art movements & major exponents; modern concept of advertising, designing and visual communication; experimental modes in contemporary visual expression; development of art education in India from colonial (British) art schools till the present.

UNIT:-IX

The study of art in the Far East, South East and Central Asia and the ancient Near-East

UNIT:-X

Understanding visual practices of traditional communities and their contemporary transformations – the 'folk', 'tribal' and craft practices in India

Indian Folk and Tribal Art:

Phad, *Pichhwai* and *Kavad* painting (Rajasthan); *Pata* painting in Bengal and Orissa; Madhubani/Mithila painting (Bihar), Warli painting (Maharastra), Pithora painting (Gujarat); *Dhokra* bronze casting; votive terracotta objects (including votive horses offered across various states in India); wood carving and wooden dolls (Kondapalli, Karnataka, Bengal, Madhya Pradesh); leather puppets (Andhra Pradesh, Karnataka); traditional and modern textiles and functional objects (textiles of Banaras, Kanchipuram, Gujrat, Orissa, and the North-Eastern states; tie-and-dye fabrics; embroidery; *kantha*, *Phulkari*, Chamba *rumal*; metal-ware including Bidri, repousse, enamelling; jewellery including jade, beads etc.

Aesthetics:

Fundamental elements of drawing and painting. Imagery in visual arts. Origin and development of art (visual). Classification of Arts. Conceptual and Visual reality.

Relevance of study of aesthetics in painting: The early philosophical thoughts in Indian Culture. Nature and Function of Art in the society.

Indian aesthetics: Concept of Ras-Sutra and its commentaries: The Theory of Rasa, Sadharanikarana, Dhvani, Alankara, Auchitya,etc; *shilpa* texts like the *Chitrasutra* of the *Vishnudharmottara Purana*, *Shadanga* from Yashodhara's commentary on the Kamasutra, etc.; A.K. Coomaraswamy and Rabindranath Tagore's contributions towards Indian aesthetics

Western Aesthetics: Theory of imitation and representation, catharsis (Plato and Aristotle). Aesthetical views of Kant, Hegel, Croce, Tolstoy, Baumgarten, Schopenhauer, Clive Bell, Roger Fry, I. A. Richards, Susanne Langer, Sigmund Freud, and George Santayana.

History of Drawing and Painting:

Indian painting: Prehistoric Paintings in India, Wall paintings of Ajanta, Bagh, Badami and Sittanavasal.Manuscript painting tradition Pala and Western Indian.Tradition of Miniature paintings: Pre-Mughal, Mughal, Rajasthani, Pahari (Basohli, Guler-Kangra and Garhwal) and Deccani painting (Ahmendagar, Bijapur & Golconda). Company School of painting. Advent of Modernism with Raja Ravi Varma, Bengal School: Abanindranath Tagore and his disciples, Nandalal Bose and his disciples.

Breakthrough in Indian painting: Contribution of Amrita Sher-Gil. Progressive artist group – Bombay, Calcutta Group – Calcutta, Shilpi Chakra – Delhi, Chola mandala – Madras and Baroda School – Baroda.

In Indian Art the Major trends of Indigenous since 1970, Contemporary painting and eminent artists: Impressionistic, Expressionistic, Abstraction, Decoration, Neo-Tantric, Figurative and Non-figurative, Surrealistic, Representational and Non-representational painting.

Western Painting: Prehistoric paintings of France and Spain. Egyptian, Aegean Art, Greece and Roman painting. Byzantine, Gothic, Renaissance, Mannerism, Baroque, Rococo, Neo-Classicism, Romanticism, Realism, Impressionism, Post Impressionism, Fauvism & Symbolism, Cubism, Futurism, Dada & Surrealism Expressionism, Abstract Expressionism, Op and Pop Art, Minimal Art & Post Modern Trends, New Media, Installation and Illusory Hyper Realism, etc.

Material and Method:
Application of Materials, Support in Painting (Canvas, Paper, Wall surface, Panels), Mix media. Oil painting and its technique – Traditional and Non-traditional. Techniques of Wall paintings – Traditional (Fresco Secco and Buono) and Modern. Water color painting, wash technique, pastel and crayon, Acrylic color, color preparation and technical aspect of pigments. Color theory and color harmony.

Art Schools and Art Education:
The introduction of formal training in art through Colonial Art Schools, and the transition from Colonial understanding to Post-Independent art education in the art schools at Chennai, Kolkata, Lahore, Mumbai, Delhi, Lucknow, Jaipur; art promotion and education through art academies; rethinking institutional art education at Santiniketan and Baroda; role of art galleries and museums in art education; increase in curatorial venture as a collaboration between the museum, galleries and practicing artists and historians; role of art journals and magazines in the dialogue between viewing public and the artist.

Applied Art

Elements & principles of design
The term 'Graphic Design' and William Addison Diggings; Basics of Graphic Design/Applied Art: Image and Text; Developing message to promote product.

Terms and terminologies relevant to advertising Industry: Understanding of the 'Portmanteau' terms such as, Advertorials, Info graphics, Infomercials, Edutainment etc.

Innovations and Movements
History of advertising in India and rest of the world; Calligraphy, Advent of moveable types, Typefaces, fronts and families; Architecture and anatomy of letters; Classifications of types and size, Early Typographers and study of traditional hand writing and script like Indian manuscripts, Persian, Chinese, Japanese and Roman etc.

Development of printing processes in India and rest of the world: letterpress, gravure, silk-screen and Offset etc.

Movements that influenced graphic design: Art Nouveau, The Art of War), The ISMs of Art: Futurism, Dada, De Stijl, & Constructivism, Art and Craft movement, Bauhaus movement and new typography, history of graphic design and the nature of advertising history, Illustrated Modernism & Psychedelia, New Wave and Post Modernism, Digital Expressionism & Postscript, The Digital Future.

Advertising forms and media

Print, outdoor, electronic and new media advertising; Media Options: newspapers and magazines, radio, TV and cinema, posters, Direct Mail, Ambient and Guerrilla advertising, digital and online advertising. Viral Advertising. Boom in Outdoor advertising: billboards and transits, innovative Materials and advantages.

Emergence of Poster as a 'new genre of art': Study of posters with reference to Poland, Japan, UK and America and Bolshevik Russia. Placards and propagandas, Protest and Wartime posters, Subway culture.

Cultural frames of advertising phases: Idolatry, Iconology, Narcissism, and Transition from 'Totemism' (the fourth cultural frame) to 'Mise-en-Scene' (Fifth Frame); Evolution from Traditional to Industrial to Consumer society & development of communications media. Future of advertising and advertising agencies. Blurring the lines between advertising and entertainment

The impact of Graphic Design with advance technology; Re-defining "Graphic design"; Attributes needed by the modern designers.

Design, campaign and packaging

Designing of logo, rebus, symbol, mark and corporate identity; stories behind the development of most well-known symbols/identities the world; Brands, rebranding and brand positioning; Precursors and prophets of advertising theories and principles; Designing events –Event Mascots and other global entertainments, films and festivals.

Campaign planning and strategy: the client, market research, account planning, creative brief.

Developing visuals and messages for print-ads (newspaper and magazines), Direct Mail, posters, outdoor advertising (billboards and transits), merchandising, show-windows and supermarket items (Point of sales / Point of Purchase items, dispensers, stands, stalls etc.)

Media selection, Approaches& the target audience. Innovations in media. New technologies, TV graphics, multimedia presentation, web-page designing and understanding of rector and vector software; Internet – its use in advertising products and services, net marketing.

Prepress, Printing presses, and Post-press: manipulations of pixels and resolutions, colour corrections, knowledge of computer-to-plate graphic reproductions, offset printing, Finishing and Converting. Additive and subtractive colours, four colour printing mechanics, Spot Colours and Lainations, UVs etc.

Design of packaging, merchandising and novelties.

Advertising corporate and new trends

Origin and growth of advertising agencies: Role and responsibilities of a Graphic designer. Creative core: Creative/Art Director, Visualizer, and Copywriter, interaction in developing concepts.

World's leading Advertising Corporates, Multinationals and Indian scenario: Indian Advertising Agencies with all India branches. Ad-Gurus or remarkable Ad-Men and epoch making advertising campaigns by them. Highest honours, Awards in the advertising creativity and extraordinary contribution.

Famous designers of the world on branding and corporate identity design, Film titles.

Interdisciplinary participation approach with disciplines of art, collaboration and internship with industries and corporates.

Computers and its role in creating new visual effects (Photography, Digital Graphics, Film titles, Multimedia presentations, Image Editing, Web Graphics and types of online Advertising, Web page designing); Importance of market research in advertising. Print media vs. Electronic Media.

Printmaking (Graphic Art)

Aesthetics and history:

Understanding of fundamentals of visual art (space, form, size, shape, line, colour, texture, tonal values, perspective, design and aesthetic) in relation to print making.

Understanding visual principles of composition (proportion, unity, harmony, rhythm, contrast, balance and emphasis). Reproduction of two dimensional identical prints.

Knowledge of history, invention, development and definition of print making (Graphic Art) process, techniques and materials in Asia and Europe. Japanese woodcuts and important masters of *Ukiyo-e* School and works of masters such as Hokusai, Hiroshige, Utamaro etc.

Print making as a mode of creative expression during 19th –20th century from book production to establishing of atelier/workshops, groups, experiments and influences on advertising.

Mode, medium and process:

Knowledge of types of print making techniques (i) wood-cut and lino-cut (ii) intaglio- wood and metal (iii) etching – line, aquatint, soft ground, etc. (iv) surface printing (planography, offset, oleograph etc.), (v) stencil and serigraph (iv) other techniques- colography, *chine-collé*, monoprint, unique print, dry-point, engraving, mezzotint, viscosity, digital imaging, mix medium etc.

Knowledge on use of different kinds of mediums, materials and printing process used in print making (wood, lino, copper, zinc, plywood, stone, acrylic, paper, cardboard, gum, acids, chemicals, ink, resin, software, tools, machine, equipment etc. Preparation of different types of surface from identification of material to designing till printing.

Work of art:

Knowledge of works of master print makers and their contribution in development of printmaking from historic to modern like Durer, Rembrandt, Hogarth, Goya, Gauguin, Degas, Lautrec, Daumier, German expressionists (Kathe Kollwitz, Nolde, Heckel, Grosz, Munch etc.), Picasso, Pop and figurative artists (Rauschenberg, Lichtenstein, Jim Dine), David Hockney, Krishna Reddy, Peter Daglish, Stanley Jones, Paul Lingren, Carol Summers etc.

Development of Printmaking in India, contribution and influence of British during colonial period, establishment of press and schools, popular printmaking in mid-19th century till pre independence. Print making trends in India post independence.

Contribution of Indian print makers: Raja Ravi Varma, member of Vichitra club, Mukul Dey, Gangendranath Tagore etc. Santiniketan School, Nandalal Bose, Binode Behari Mukherjee, Ramkinkar, Biswarup Bose, Ramen Chakraborty, Haren Das, Somnath Hore, Chittaprasad, Jyoti Bhatt, Kanwal Krishna, Devyani Krishna, Y.K. Shukla, Vasant Parab, Jagmohan Chopra, Paramjeet Singh, Lalita Lajmi, Naina Dalal, Laxma Goud, R.B. Bhaskaran, R.M. Pallaniappan, Sanat Kar, Lalu Prasad Shaw, Amitabh Banerjee, Debraj Dakoji, Bhupen Khakhar, Waman Chincholkar, Paul Koli, Deepak Banerjee, Jai Zharotia, Prayag Jha, Rini Dhumal, Anupam Sud, Jayant Parikh, Kanchan Chander etc.

Print and issues:

Good quality prints - criteria (technically and aesthetically), conventions to identify the authenticity of prints – signature, editions, artists proof etc. Display - mounting and preservation of prints. Various issues related to the contemporary printmaking (mechanical production, computer graphics, influences of advertising, atelier, workshops and groups etc.)

Sculpture

Elements & principles of sculpture

Fundamentals and elements of sculpture; origin and development of imagery in sculpture; classification of sculpture; sculptural form vis-a-vis conceptual reality.

Relevance of the study of aesthetics for sculptural practice: the early philosophical ideas in India and the West; the role and function of sculpture in the society.

History of sculpture in Western and Oriental traditions; traditional sculptural program as integral part of architectural structures such as churches, temples and secular buildings
Study of form, material, methods, and techniques relevant to sculptural practice; clarity of understanding of terminologies related to the art of sculpture.

Study of varied media in sculptural practice:

1. Clay and wax
   Preparation of natural clay for sculpture; modelling and casting with clay; terracotta & firing of clay; types of kilns; possibilities in the range of colours and pigments in ceramic works; two-dimensional and three-dimensional modes in clay sculptures; modelling and carving in wax.

2. Plaster of Paris (POP)
   History, chemical composition and physical nature of POP; advantages and disadvantages of working with POP; accelerating and retarding agents; surface treatment of POP; casting and carving in POP.

3. Wood
   Nature and varieties of wood; carving tools and methods of carving for sculpting in wood; seasoning and preservation of wood; finishing and staining of wood.

4. Stone
   Origin of sculpting in stone; tools and equipment, methods and approach relevant to stone carving; treatment and preservation of stone against weathering.

5. Metal
   History of metal sculptures; processes involved in the use of metal as medium for sculpture; physical properties and classification of metals as ferrous and non-ferrous, alloy, etc.; bronze as the primary sculptural metal; the Lost-wax method (*cire-perdue*); indigenous methods including "gravity casting", "sand casting", etc.; melting points of metals; surface treatment viz. anodising, oxidation and patination; welding and forging processes for working with metals; preservation of metal sculptures.

Assemblage and Installation
History & background of mix-media; new hybrid forms of 1960's and more recent developments; public sculptures; environmental art.

Monumental sculpture:
Scope, problems, limitations, concept and development; eminent exponents such as D.P. Roychowdhary, Ramkinkar Baij, Prodosh Dasgupta, Sankho Chaudhurai, Piloo Pochkhanawla, Chintamoni Kar, Sarbari Roy Chowdhury, Amarnath Sehgal, Dhanraj Bhagat, Kanayi Kunhiraman, M. Dharmani, Nagji Patel, Balbir Singh Katt.

Contemporary Indian Sculptors:
Combine indigenous knowledge with new materials and techniques; select individuals – B.C Sanyal, Somnath Hore, K.G. Subramanyan, Biman B. Das, Meera Mukherjee, Raghav Kaneria, Himmat Shah, Latika Katt, Jeram Patel, Ajit Chakraborty, Sushen Ghose, Satish Gujral, Ved Nayar, P.V Janakiram, Shiv Singh, Balan Nambiar, S. Nandgopal, Mahendra Pandya, Rajnikant Panchal, Mrinalini Mukherjee, K.S. Radhakrishnan, S. Nandgopal, Dhruva Mistri, Pritpal Singh Ladi, Anita Dube, Ravindra Reddy, N.N. Rimzon, Pushpamala N., Sudarshan Shetty, Subodh Gupta , Anish Kapoor, etc.

Contribution of select modern & contemporary sculptors from the West:
Honore Daumier, Auguste Rodin, Camille Claudel, Paul Gauguin, Aristide Maillol, Antoine Bourdelle, Henri Matisse, Ernst Barlach, Constantin Brancusi, Pablo Picasso, Aleksandr Archipenko, Raymond Duchamp-Villon, Jacques Lipchitz, Henri Laurens, Umberto Boccioni, Vladimir Tatlin, Naum Gabo, Sophie Tauber, Jean Arp, Max Ernst, Antoine Pevsner, Alexander Calder, Henry Moore, Barbara Hepworth, David Smith, Louise Bourgeois, Isamu Noguchi, Alberto Giacometti, Cesar, Marino Marini, Lucio Fontana, George Segal, Claes Oldenburg, Anthony Caro, Tony Smith, Donald Judd, Carl Andre, Eva Hesse, Duane Hanson, Judy Chicago, Joel Schapiro, Barry Flanagan, Georg Baselitz, Jimmie Durham, Jeff Koons, Kiki Smith.

****

SKILL INSTRUCTOR- GERMAN
SYLLABUS

UNIT I: Sprachkompetenz

1.1 Grammatik – z.b. Artikel, Kasus, Präpositionen, Pronomen, Verben, Modalverben, Tempora, Passiv, Konjunktiv II, Adjektivdeklination, Steigerung

1.2 Wortgebrauch – Wortschatz zu Alltag, Beruf und Gesellschaft; Wortbildung (Präfixe, Suffixe, zusammengesetzte Nomen); Synonyme und Antonyme; Kollokationen, Redewendungen, Konnektoren; formelle und informelle Ausdrücke

1.3 Satzbau – Wortstellung in Haupt- und Nebensätzen; Satzverbindungen mit Konjunktionen; Infinitivsätze mit zu; Relativsätze; Verneinung; Umformung von Sätzen

1.4 Rechtschreibung – Groß- und Kleinschreibung, s-Laute (s, ss, ß), Getrennt- und Zusammenschreibung, Zeichensetzung (Komma), häufige Rechtschreibfehler

1.5 Leseverstehen – Kurze und mittellange Texte (Hinweise, Anzeigen, E-Mails, Berichte, Zeitungstexte).

UNIT 2: Literatur und Literaturgeschichte

2.1 Epochen – Mittelalter bis Gegenwart: Merkmale und Vertreter

2.2 Autoren – Bekannte Autorinnen und Autoren und ihre Bedeutung z. B. Lessing, Goethe, Schiller, Heine, Fontane, Kafka, Brecht, Borchert, Böll

2.3 Texte – Bekannte Werke und Textausschnitte z.B. Gedichte, Kurzgeschichten, Dramen- und Romanauszüge

UNIT 3: Übersetzungswissenschaft

3.1 Theorien – Grundbegriffe der Übersetzungswissenschaft: wörtliche und freie Übersetzung, Äquivalenz, Skopostheorie; Übersetzungsmethoden und -strategien

3.2 Probleme – Kulturspezifika, Redewendungen, falsche Freunde, Satzbau Deutsch–Englisch–Hindi

3.3 Übersetzungswerkzeuge – Wörterbücher, maschinelle Übersetzung, Tools

3.4 Textsorten und Praxis – Gebrauchs-, Fach- und literarische Texte, Übersetzung von Sätzen und kurzen Texten, Fehlerkorrektur

UNIT 4: Didaktik

4.1 DaF-Didaktik – Lehrmethoden, Vermittlung der vier Fertigkeiten und von Grammatik und Wortschatz;Fehlerkorrektur

4.2 Lehrplan, Planung und Strategien – Curriculum, Lernziele, Unterrichtsplanung, Lehrwerke,Lehr- und Lernstrategien.

4.3 Digitale Medien – Sprachlabor, Lern-Apps, Online-Plattformen, KI-Tools

4.4 Leistungsbewertung – Tests, Prüfungsformate (Goethe, telc, ÖSD), Feedback

4.5 Berufsbezogenes Deutsch – Wirtschaftsdeutsch, Kundenservice, Vorbereitung auf das Berufsleben

UNIT 5: Landeskunde

5.1 Geschichte und Gegenwart – Kaiserreich bis Wiedervereinigung und gegenwart

5.2 Politik – Politisches System der Bundesrepublik Deutschland, Bundestag, Bundesrat, Parteien und Wahlen, EU

5.3 Kultur – Alltag, Feste, Musik, Kunst, Film, Medien, interkulturelle Kommunikation

5.4 Wissen über DACH – Geografie, Bundesländer, Städte, Wirtschaft, Bildungssystem

SKILL INSTRUCTOR (HOSPITALITY)

UNIT-i: Food and Beverage Service; Introduction to the hospitality industry and F&B service, types of food service establishments, F&B service outlets and their staff, service equipment (crockery, cutlery, glassware), table setting and napkin folding, types of service (table, buffet, counter, room service), menu basics, non-alcoholic beverages (tea, coffee, juices, mocktails), meal and order taking, billing, personal hygiene and grooming, guest handling and etiquette.

UNIT-II: Food Production (Kitchen); Introduction to kitchen and its layout, kitchen brigade and duties, kitchen tools and equipment, fuels used, methods of cooking, cuts of vegetables, stocks, sauces and soups, basic Indian, Chinese and Continental recipes, bakery basics, storing and handling of raw material, kitchen hygiene, food safety, FSSAI and basic food licences, food cost and portion control.

UNIT-III: Housekeeping; Introduction and importance of housekeeping, department organisation and staff duties, coordination with other departments, cleaning equipment and cleaning agents, cleaning of guest rooms and bathrooms, bed making, types of linen and linen room, laundry basics, staff uniforms, daily, weekly and periodic cleaning schedules, keys and lost and found control, pest control basics, safety and first aid.

UNIT-IV: Front Office; Introduction to front office and its layout, hotel types and room types, front office staff and their duties, guest cycle, reservation (types, process, cancellation, no-show), registration and check-in, room rates and tariff, handling guest requests and complaints, telephone and communication etiquette, guest departure and check-out, bills and payment methods, basics of hotel software.

UNIT-V: Airline and Airport Operations; Introduction to the aviation industry, types of airlines and airports, airport layout and key terms, airline and airport departments and staff, passenger check-in and boarding, baggage handling, ticketing and reservation basics, airline and airport codes, ground handling services, cabin crew duties, in-flight service, customer service and handling special passengers, immigration, customs and security checks, aviation safety and emergency procedures, communication skills.

SYLLABUS FOR SKILL INSTRUCTOR (JAPANESE)

1. **Japanese Language Proficiency:** Basic to Advance level Japanese grammar, vocabulary, kanji (Onyomi and Kunyomi), sentence formation, reading comprehension, translation (Japanese–English and English–Japanese), composition and practical language usage.

2. **Japanese Language and Culture:** Japanese history, major historical periods, festivals, traditions, customs, social etiquette, contemporary Japanese society, cultural practices and India–Japan relations.

3. **Business Japanese and Workplace Communication:** Business vocabulary, formal communication, honorific expressions (敬語), business correspondence, email writing, telephone conversations, meetings, professional etiquette, workplace discipline and Japanese corporate culture.

4. **Japanese Language Teaching and Pedagogy:** Foreign language teaching methodologies, Communicative Language Teaching (CLT), Task-Based Language Teaching (TBLT), lesson planning, classroom management, teaching of grammar, vocabulary and kanji, assessment techniques and use of digital teaching resources.

5. **Industry-Oriented Japanese and Skill Development:** Application of Japanese in manufacturing, hospitality, tourism and business sectors; workplace terminology, safety instructions, professional communication, interview preparation, employability skills and industry-specific language training.

6. **General Awareness and Reasoning:** General awareness of India and Japan, contemporary developments in bilateral relations, Japanese geography and economy, logical reasoning, basic numerical aptitude, NEP 2020, Skill India Mission and vocational education.

· Skill Instructor – Mechanical (RAC)

Unit 1. Engineering Thermodynamics

Basic concepts: system, surroundings, properties, state, process and thermodynamic equilibrium. Zeroth, first and second laws of thermodynamics. Internal energy, enthalpy, entropy, heat and work. Specific heats, ideal gases and gas laws. Sensible heat, latent heat and phase-change processes. Thermodynamic processes: isothermal, isobaric, isochoric and adiabatic. Properties of pure substances. Carnot cycle, reversed Carnot cycle and vapour compression refrigeration cycle. Coefficient of performance (COP), refrigeration effect, heat rejection and energy efficiency.

Unit 2: Fluid Mechanics and Fluid Flow

Properties of fluids, Pressure: atmospheric pressure, vacuum and pressure measurement. Pascal's law and hydrostatic pressure. Continuity equation and conservation of mass. Bernoulli's theorem and its practical applications. Laminar and turbulent flow; Reynolds number. Flow through pipes, frictional losses and minor losses. Flow measurement using orifice meters, venturimeters and rotameters. Centrifugal pump and its performance characteristics.

Unit 3. Fundamentals of Refrigeration and Air Conditioning

Meaning, purpose and applications of refrigeration and air conditioning. Refrigeration units: tonne of refrigeration (TR), kW, kcal/h and BTU/h. Refrigeration effect, heat load and cooling capacity calculations. Refrigeration methods: vapour compression, vapour absorption, air-cycle, and thermoelectric refrigeration. Basic psychrometric properties and their relation to air-conditioning processes. Domestic refrigerators, water coolers, deep freezers, bottle coolers and commercial refrigeration systems. Room air conditioners, split ACs, packaged units and central air-conditioning systems. Refrigerant classification, properties, selection and environmental impact. Heating and cooling load estimation. Air filters, ducts, dampers, grilles, diffusers and fans. Refrigeration and air conditioning system installation, commissioning, servicing, and preventive maintenance.

Unit 4. Compressors, condensers and evaporators

Types of compressors: reciprocating and their construction, working principles and applications. Compressor efficiency and performance curves. Compressor motors and electrical connections. Common faults and Compressor testing.

Condensers: Functions and working principles of condensers. Air-cooled, water-cooled and evaporative condensers. Natural and forced convection. Condenser capacity, fouling, scaling, airflow problems and high-head-pressure faults. Condenser maintenance and performance testing.

Evaporators: Types: bare-tube, plate, finned-tube, shell-and-tube and flooded evaporators. Evaporator capacity. Evaporator fans, airflow and heat-transfer enhancement. Common faults, inspection, cleaning and performance evaluation. Heat-transfer fundamentals, log mean temperature difference (LMTD), overall heat-transfer coefficient and basic heat-exchanger calculations.

Unit 5: Engineering Materials

Classification of engineering materials: metals, alloys, polymers, ceramics and composites. Properties of materials: strength, hardness, toughness, ductility, malleability and corrosion resistance. Ferrous materials: cast iron, mild steel, stainless steel and alloy steels. Non-ferrous materials: copper, aluminium, brass and bronze. Materials used in refrigeration systems. Corrosion, galvanic corrosion and preventive measures. Basic heat treatment of metals. Material selection based on temperature, pressure, compatibility and operating conditions.

Unit 6. Welding, Brazing and Workshop Technology

Basic fitting operations: marking, measuring, cutting, filing, drilling and threading. Hand tools and power tools used in RAC servicing. Oxy-acetylene gas welding and cutting. Arc welding fundamentals and basic welding processes. Brazing and soldering: principles, differences, applications and limitations. Pipe bending, flaring, swaging and tube expansion. Inspection and testing of joints for leakage and mechanical integrity. Safe handling of gas cylinders, torches and combustible materials. Welding defects and basic inspection methods.

Unit 7. Instrumentation and Measurement

Fundamentals of measurement: accuracy, precision, sensitivity, resolution and errors. Calibration, repeatability and uncertainty in measurement. Temperature measurement, pressure measurement, vacuum measurement, humidity measurement and airflow measurement. Electrical measurements: measurement of voltage, current, resistance, power and energy. Temperature controllers, pressure controls, and defrost timers. Sensors, transducers, control boards and electronic control systems. Variable-frequency drives (VFDs) and inverter-based air conditioners.

Unit 8 Electrical and Electronic Fundamentals

Basic electrical quantities, Ohm's law and electrical power. AC and DC circuits; single-phase and three-phase supply fundamentals. Series and parallel circuits. Electrical wiring, earthing, fuses, MCBs, RCCBs and overload protection. Types of electric motors**.** Capacitors, relays, contactors, thermostats and overload protectors. Motor starting methods and basic motor fault diagnosis. Temperature controllers, pressure controls and defrost timers. Sensors, transducers, control boards and electronic control systems. Variable-frequency drives (VFDs) and inverter-based air conditioners.

SKILL INSTRUCTOR (MLT)

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; 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. Composition of blood and its functions, Origin, Development, and morphology of Blood cells, Basic concepts of Anaemia, Leukaemia, and hemorrhagic disorder.

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

SKILL INSTRUCTOR –MUSIC (VOCAL & INSTRUMENTAL)

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.

Skill Instructor Nursing

Anatomy

Introduction to Anatomical terms organization of the human body, The Skeletal System, The Muscular System, The Nervous System, The Sensory System, Circulatory and lymphatic system, The Respiratory System, The Digestive System, The Excretory System (Urinary), The Endocrine System, The Reproductive System including breast.

Physiology

Cell Physiology, Skeletal System, Muscular System, Nervous System, Circulatory System, The Respiratory System, The Digestive System, The Excretory System, The Sensory Organs, The Endocrine System, The Reproductive System, Lymphatic and Immunological System.

Nutrition

Introduction,Carbohydrates, Fats,Proteins, Energy, Vitamins, Mineral,Water & electrolytes, Cookery rules and preservation of nutrients, Balanced Diet,Role of nurse in nutritional programmes.

Biochemistry

Introduction, Structure and functions of Cell membrane, Composition and metabolism of Carbohydrates, Composition and metabolism of Lipids, Composition and metabolism of amino acids and Protein, Composition and metabolism of vitamins and minerals, Immunochemistry.

Nursing Foundations

Introduction, Hospital admission and discharge, Communication and Nurse patient relationship, The Nursing Process, Documentation and Reporting, Vital signs,Health assessment, Machinery, Equipment and linen, Meeting needs of patient, Basic needs (Activities of daily living), Physiological needs, Fluid, electrolyte, and Acid-Base Balances, Psychosocial Needs, Infection control in Clinical settings, Administration of Medications,Meeting needs of Perioperative patients,Meeting special needs of the patient, Care of Terminally ill patient, Hospital management system.

Psychology

Introduction, Biology of behaviour, Cognitive Processes,Motivation and Emotional Processes, Personality, Developmental Psychology, Mental hygiene and mental Health, Psychological assessment & tests.

Microbiology

Introduction, General characteristics of Microbes, Infection Control, Pathogenic organisms, Immunity.

Sociology

Introduction, Individual & Society, Culture, Biodiversity and its conservation, social groups and processes,Population, Family and Marriage, Social Stratification, Types of Communities in India (Rural, Urban and Regional), Social Change, Social organization and social system, Social Control, Social Problems.

Pharmacology, Pathology and Genetics

Introduction, Chemotherapy, Pharmacology of commonly used antiseptics, disinfectants and insecticides, Drugs acting on G.I system, Drugs used on Respiratory Systems, Drugs used on Urinary System, Miscellaneous, Drugs used on skin and mucous membranes, Drugs acting on Nervous system, Cardiovascular drugs, Drugs used for hormonal disorders and supplementation, contraception and medical termination of pregnancy, Introduction to Drugs used in alternative system of medicine.

Pathology

Introduction, Special Pathology, Clinical Pathology, Examination of body cavity fluids, transudates and exudates, Urine and faeces.

Genetics

Introduction, Maternal, Prenatal and genetic influences on development of defects and diseases,Genetic testing in the neonates and children, Genetic conditions of adolescents and adults, Services related to Genetics.

Medical Surgical Nursing(Adult including Geriatrics)

Introduction, Introduction to Medical Surgical asepsis, Common signs and symptoms and management, Nursing management of patients(adults including elderly)with respiratory problems, Nursing management of patient(adults including elderly)with disorders of digestive system, Nursing management of patient(adults including elderly)with blood and cardio vascular problems, Nursing management of patient(adults including elderly)with Genito-urinary problems, Nursing management of disorder of male (adults including elderly) reproductive system, Nursing management of patient(adults including elderly)with disorder of endocrine system, Nursing management of patient(adults including elderly)with disorder of integumentary system, Nursing management of patient(adults including elderly)with musculoskeletal problems, Nursing management of patient(adults including elderly)with Immunological problems, Nursing management of patient(adults including elderly)with Communicable Diseases, Peri operative nursing, Nursing management of patient with disorders of Ear Nose and throat, Nursing management of patient with disorders of eye, Nursing management of patient with Neurological disorders, Nursing management of patient with disorders of female reproductive system,Nursing management of patient with Burns, reconstructive and cosmetic surgery, Nursing management of patient with oncological conditions, Nursing management of patients in EMERGENCY & DISASTER situations, Emergency Nursing, Nursing care of the elderly, Nursing management of patient in critical care units, Nursing management of patients adults including elderly with occupational and Industrial disorders.

Community Health Nursing

Introduction, Determinants of health, Epidemiology, Epidemiology and Nursing management of common communicable diseases, Epidemiology and Nursing management of common nonCommunicable diseases, Demography, Population and its Control, Health planning and policies and problems,Delivery of community health services, Community health nursing approaches, concepts and roles and responsibilities of nursing personnel, Assisting individuals and groups to promote and maintain their health, National health and family welfare programmes and the role of a nurse, Health Agencies.

Communication & Education Technology

Review of Communication Process, Interpersonal relations, Human Relations, Guidance and Counselling, Principles of Education & Teaching Learning Process, Methods of teaching,educational media,Assessment, Information, Education & Communication for health (IEC).

Child Health Nursing

Introduction Modern concepts of childcare, The healthy child, Nursing care of a neonate, Integrated management of neonatal and childhood illnesses (IMNCI), Nursing management in common childhood diseases, Management of behavioural &social problems in children.

Mental Health Nursing

Introduction, Principles and Concepts of Mental Health Nursing, Assessment of Mental health status, Therapeutic communication and nurse - patient relationship, Treatment modalities and therapies used in mental disorders, Nursing management of patients with Schizophrenia, and other psychotic disorders, Nursing management of patients with mood disorders, Nursing management of patients with neurotic, stress related and somatization disorders, Nursing management of patients with substance use disorders, Nursing management of patients with Personality, Sexual and eating disorders, Nursing management of Childhood and adolescent disorders including mental deficiency,Nursing management of patients with Organic brain disorders, Psychiatric emergencies and crisis intervention, Legal issues in mental health nursing, Community Mental Health Nursing.

Nursing Research and Statistics

Research and research process, Research Problem/Question, Review of Literature, Research approaches and designs, Sampling and data collection, Analysis of data, Introduction to statistics,Communication and utilization of Research.

Midwifery and Obstetrical Nursing

Introduction to midwifery and obstetrical Nursing, Review of anatomy and physiology of female reproductive system and foetal development, Assessment and management of pregnancy (ante-natal) : Normal pregnancy, Assessment and management of intra-natal period, Assessment and management of women during post-natal period: Normal puerperium, Assessment and

management of normal neonates, High-risk pregnancy - assessment & management, Abnormal Labour – assessment and management, Abnormalities during Postnatal Periods, Assessment and management of High risk newborn, Pharmaco-therapeutics in obstetrics, Family Welfare Programme.

Management of Nursing Services and Education

Introduction to Management in Nursing, Management Process, Management of Nursing Services in the Hospital & Community, Organizational Behaviour and Human Relations, In service Education, Management of Nursing educational institutions, Nursing as a Profession,Professional Advancement

Syllabus for written test – Skill Instructor (Pharmacy)

Pharmaceutics: Dosage Forms: Tablets, Capsules, Syrups, Elixirs, Ointments, Creams, and Injectables. Dispensing Pharmacy: Prescription Handling, Incompatibilities, Posology, and Latin Terms. Sterilization: Principles and Methods including Autoclave and Hot Air Oven; Unit Operations: Mixing, Size separation, Filtration, Distillation.

Hospital & Clinical Pharmacy: Hospital Pharmacy Management, Inventory Control (ABC and VED Analysis), Drug Distribution Systems, Medication History Interview, Patient Counseling, Drug Interactions, and Adverse Drug Reaction (ADR) Monitoring.

Pharmacology & Toxicology General Pharmacology: Pharmacokinetics (ADME), Pharmacodynamics, Drug-Receptor Interactions. Systemic Pharmacology: Drugs acting on ANS, CNS, Cardiovascular System, Respiratory System, and Endocrine System. Chemotherapy: Antibiotics, Antifungals, Antivirals, and Anticancer Agents. Toxicology: Principles of Toxicology, Poisoning, and Management of Drug Toxicities.

Pharmaceutical Chemistry Inorganic Chemistry: Limit Tests for Chloride, Sulfate, Iron, and Arsenic; Electrolytes and Antacids. Organic/Medicinal Chemistry: Structure-Activity Relationship (SAR), Therapeutic Uses of NSAIDs, Antibiotics, Local and General Anesthetics; Basic concepts and instrumentation related to: UV spectroscopy, IR Spectroscopy, Thin layer chromatography, HPLC, Column chromatography.

Pharmacognosy: Classification of Crude Drugs, Phytochemical Screening, Evaluation of Purity, Detection of Adulteration, Medicinal Plants, Alkaloids, Glycosides, Tannins, and Volatile Oils.

Pharmacy Ethics & Regulations: Pharmacy Act, 1948; Pharmacist Registration and Duties. Drugs & Cosmetics Act, 1940 and Rules 1945. Important Schedules including H, G, and X. Licensing Requirements. NDPS Act, DPCO, and MTP Act.

SKILL INSTRUCTOR (PHYSICS)

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

Written Test Syllabus - Skill Instructor (Physiotherapy)

Unit-I (ANATOMY) : General Anatomy, Musculoskeletal system, Upper and lower extremity, Spine and thorax, Head and neck, Nervous system, Sensory system, Cardiovascular system, Lymphatic system, Respiratory system, Digestive system, Urinary and Reproductive system, Endocrine system

Unit-II (PHYSIOLOGY) : General Physiology, Blood, Cardiovascular system, Respiratory System, Nerve Muscle Physiology, Nervous, Digestive & Renal System, Endocrinology, Male & female reproductive system

Unit-III (CLINICAL BIOCHEMISTRY) : Nutrition, Carbohydrates, Lipids, Amino Acids, Proteins, Study of hemoglobin and myoglobin with their functions, Enzymes, Biochemistry of connective tissue, Vitamins, Diabetes mellitus

Unit-IV (GENERAL PSYCHOLOGY):- Introduction to Psychology, Fields of application of Psychology, influence of heredity and environment on the individual, Learning, Memory, Thinking, Motivation, Emotions, Attitudes, Intelligence, Personality, theories of personality, factors influencing personality, Personality Disorders, Conflict and frustration, Attention and Perception, Counseling, Development and growth of behavior in infancy and childhood, adolescence, adulthood and old age, normal and abnormal, Psychotherapy, Mental efficiency

Unit-V (ETHICS IN PHYSIOTHERAPY) :- ETHICS- History of physiotherapy, Ethical principles in health care, Ethical principles related to physiotherapy, Scope of practice, Enforcing standards in health profession-promoting quality care, Professional ethics in research, education and patient care delivery, Informed consent issues, Medical ethics and Economics in clinical decision-making, Rules of professional conduct ,Confidentiality and Responsibility, Malpractice and negligence, Provision of services and, advertising, Legal aspects.

Unit-VI (BIOMECHANICS AND KINESIOLOGY) :- Mechanics, Motion, Force, Friction, Gravity, Equilibrium, Levers, Pulleys, Elasticity, Springs, Muscular system, Definition, properties of muscle, muscular contraction, structural classification, action of muscle in moving bone, direction of pull, angle of pull, functional classification, coordination of muscular system, Joint structures and functions, . Posture, Gait

Unit-VII (EXERCISE THERAPY – I) :- Introduction to exercise therapy, Mechanical principle applied in human body, Disability models, Movements, Passive & active movements, Starting positions, Relaxation, Suspension, Balance, Neuromuscular coordination, Joint range measurement, Measurement of limb length, girth, Manual muscle testing, Mobility aids, Soft tissue manipulation (massage)

Unit-VIII (ELECTRO THERAPY – I) :- Basic components of electric current, Current electricity, Magnetism, theories of magnetism, properties of magnet, Electromagnetic induction, electromagnetic radiation, laws governing radiations, Electrical components, Types of electric current, wave forms, current modulation, Safety issues while using electrical equipments, Muscle and nerve response to electrical stimulation, Pain, Low frequency currents, Electro diagnostic test, Interferential therapy (IFT)

Unit-IX (MEDICAL MICROBIOLOGY) :- Introduction & History of Microbiology, . Classification of microorganism, Bacteriology, Bacterial growth/Reproduction, Sterilization & disinfection, Modes of transmission of diseases, Bacterial diseases (in brief), Viral diseases (in brief), Fungal diseases and opportunistic infections (in brief), Immunity, AIDS - Aetiology, modes of transmission, diagnostic procedure, Handling of infected material.

Unit-X (PATHOLOGY) :- Introduction to Pathology, Cell injuries, Inflammation and Repair, Circulatory Distrurbances, Growth Disturbances and Neoplasia, Hematology, Respiratory System, Cardiovascular Pathology, Hepato Biliary Pathology, Musculoskeletal System, Endocrine pathology, Neuropathology, Dermatopathology, Congenital Myopathy &mysthenia gravis.

Unit- XI (PHARMACOLOGY) :- General Pharmacology, Autonomic Nervous system, Cardiovascular Pharmacology (in brief), Neuropharmacology (in brief), Disorders of Movement (in brief), Inflammatory/Immune Diseases, Respiratory Pharmacology (in brief), Digestion and Metabolism (in brief), Geriatrics

Unit- XII (EXERCISE THERAPY – II) :- Joint mobilization, Stretching, Resisted exercise, Proprioceptive Neuromuscular Facilitation, Aerobic Exercises, Hydrotherapy, Balance training, Posture Breathing Exercises, Gait Training, Soft Tissue Injury, Yoga: History, Introduction, Classification, Various Asana

Unit- XIII (ELCTROTHERAPY – II) :- Introduction to high frequency current, Electro Magnetic Spectrum, SWD, Micro Wave Diathermy, Ultrasound, IRR, UVR, LASER, Wax Therapy, Contrast Bath, Moist Heat Therapy, Fluidotherapy, Cryotherapy, EMG and Nerve Conduction Velocity test, Biofeed back

Unit- XIV (ORTHOPAEDICS) :- Introduction to Orthopaedics, Injuries of muscle & tendons, Bony & Soft tissue injuries, Fractures, Inflammation of bones & joints (Clinical features, evaluation, conservative & surgical management), Nutritional & metabolic diseases of bones, Spine deformities, Infections of Musculoskeletal system, Congenital malformations (in brief description with outline of treatment), Developmental diseases of skeleton, Neuromuscular diseases, Upper & lower Limbs, Neuro-vascular Diseases, Amputations, Bone tumors, Operations, Othopaedic splints and appliances, Tractions : Skin, skeleton (in brief), Foot arches & their complications, Rehabilitation of patients.

Unit-XV (GENERAL MEDICINE INCLUDING PEDIATRICS & PSYCHIATRY) :- Introduction, Infectious Diseases, Nutritional & Metabolic Diseases, Alimentary tract, Brief description of liver diseases along with outline of management, Diseases of connective tissues, Diseases of skin, Geriatrics, First Aid in common Medical Emergencies, Cardio-vascular System, Respiratory System, Neurology, Developmental and degenerative syndromes, Disorders of Spinal cord and Cauda Equina, Peripheral nerve disorders, Muscle disorders

PEDIATRICS :- Normal Growth and development of child, Common infectious diseases in children, Immunization programmes, Child and nutrition, Clinical presentation, management & prevention of the following, Childhood rheumatism, Acute CNS infections, Clinical presentation, management &prevention of the following respiratory conditions, Clinical presentation, management & prevention of the following cardiac conditions

PSYCHIATRY :-Modalities of psychiatric treatment, Psychiatric illness and physical therapy link, Brief description of Etio-pathogenesis, manifestations, and management of psychiatric illnesses, Brief description of Etio-pathogenesis, manifestations, and management of psychiatric illness, Child psychiatry, Geriatric Psychiatry (in brief)

Unit-XVI (GENERAL SURGERY) :- Fluid, Electrolyte and Acid-Base disturbances, Transfusion therapy in surgery, Wounds, Pre & postoperative complications of surgery and their management, Hemostasis, Types of anaesthesia and its affects on the patient, pain relief, Types of Incisons, Burn, Skin Grafts, Infections and injuries of Hand, Surgical Oncology – Cancer, Disorders of muslces, tendons and ligaments, sports related injuries. Periarticular inflammations actemuslce injury, chronic muscles injury, Tendon disorders, tendon sheath disorder, fascia, Ganglia, Bursae, Repeatative strain injury,

Neurological disorder affecting to muscle-skeletal system , Motor dysfunction and treatment, cerebral palsy, acquired abnormalities, inherited disorder, neuromuscular disorder, sensory disorder, The cranium, Thoracic and cardiac surgery, Various surgical heart diseases with respect to clinical presentation, complications and management, Diseases of the Arteries and Veins, Definition, Indication, Incision, Physiological changes and Complications following Common operations like Cholecystectomy, Colostomy, Ileostomy, Gastrectomy, Hernias, Appendicectomy Mastectomy, Nephrectomy, Prostectomy, Obstetrics & Gynecology, ENT, Ophthalmology

Unit-XVII (COMMUNITY MEDICINE) :- Health and Disease, Epidemiology, definition and scope, Principles of Epidemiology and Epidemiological methods, Epidemiology of communicable disease, Public health administration, Health programs in India, Demography and Family Planning, Preventive Medicine in Obstetrics, Paediatrics and Geriatrics, Nutrition and Health, Environment and Health, Hospital waste management, Disaster Management, Occupational Health, Mental Health, Health Education.

Unit-XVIII (RESEARCH METHODOLOGY AND BIOSTATISTICS) :- RESEARCH METHODOLOGY - Introduction to Research methodology, Research problem, Research design, Measurement & scaling techniques, Methods of data collection, Computer technology

BIOSTATISTICS- Introduction, Tabulation of Data, Measures of Central Tendency, Measures of Dispersion, Probability and Standard Distributions, Correlation & regression, Testing of Hypotheses , Level of significance, Degrees of freedom, Chi-square test, test of Goodness of fit & student t-test, Analysis of variance & covariance, Sampling,

Unit-XIX (PHYSIOTHERAPY IN ORTHOPEADIC AND SPORTSCONDITIONS) :-

1. **Traumatology:** Brief review of the following condition and various management aims, physiotherapeutic intervention, means and technique of physiotherapy should be taught including Kalternborn, Maitland, Mulligan, Mekenzie etc.

A. **Bony Tissue**

1. Fracture and dislocations: Classification and type of displacement, method of immobilization, healing of fractures and factors affecting union, non union, delayed Union etc., common sites of fractures and their general physiotherapeutic management.
2. Specific fractures and their physiotherapeutic management.
   a) Upper limb: Clavicle, humerus, ulna, radius, crush injuries of hand.
   b) Lower Limb: fracture neck of femur, shaft of femur, patella, tibia fibula, pott's fracture, fracture of tarsal and metatarsals.
   c) Spine: fracture and dislocations of cervical, thoracic and lumbar vertebrae with and without neurological deficits.

B. **Soft tissue injuries:**

Synovitis, Capsulitis, Tendonitis and other tendon injuries around wrist, elbow, knee, shoulder, ankle, Bursitis, volkman's ischemic contracture, Tear of semilunar cartilage, menisectomy, Injury to cruciate ligaments of knee, Internal derangement of knee, and other overuse injuries important for a Physiotherapist.

2. **Surgical procedures:**

Pre and post operative physiotherapy management of common corrective procedure like arthroplasty, arthrodesis, osteotomy, patellectomy, tendon transplants, soft tissue release,grafting, including post polio residual paralysis and leprosy deformities corrections,Amputation: Level of amputation of upper limb and lower limb, stump care, stump bandaging, Pre and post operative physiotherapy management, pre and post prosthetic management including check out of prosthesis, training etc.

3. **Deformities:** Etiology, pathology, clinical presentation, diagnostic criterion general, orthotic, and Physiotherapy Management of the following: Congenital torticollis, Cervical rib, CTEV, Pes cavus , Pes planus and other common congenital deformities, Scoliosis, Increased and decreased Kyphosis, increased & decreased Lordosis, Coxa vara, Genu valgum, Genu varum and recurvatum.

4. **Degenerative and infective conditions:** Etiology, pathology, clinical presentation, diagnostic criterion, general, orthotic, and Physiotherapy Management of the following: osteoarthritis of major joints, Spondylosis, Spondylitis, Spondylolisthesis, PIVD, Periarthritis of shoulder, Tuberculosis of spine, bone and major joints, and other miscellaneous orthopaedic conditions treated by Physiotherapy.
5. **Arthritis and Allied conditions (in details):** Etiology, pathology, clinical presentation, diagnostic criterion general, orthotic, and Physiotherapy Management of the following: Osteo- Arthritis-generalized, Degenerative and traumatic, Rheumatoid Arthritis, Still's disease, infective Arthritis, Spondylitis, ankylosing spondylitis, Non articular Rheumatism, Fibrositis, trigger point, fibromyalgia, Perthes disease, Ganglion, Duputuren's contracture
6. Etiopathogenesis and physiotherapy and general management of the Edema-Traumatic, Obstructive, position dependent and Paralytic.
7. **Deficiency disease**- Rickets, Osteomalacia, Osteoporosis and other deficiency disorders related to Physiotherapy their clinical presentation, etiopathogenesis, management strategies including physiotherapy interventions.
8. **Sports Physiotherapy**
   Principle of sports physiotherapy, Causes of sports injury, Prevention of sports injuries, Management of acute sports injury, Common occurred injuries, Role of physiotherapist in sports principle and advanced rehabilitation of the injured athlete.

Unit-XX (PHYSIOTHERAPY IN NEUROLOGICAL CONDITOINS) :-

A. Review of Clinical Neuroanatomy & Neurophysiology:

Review, the structure and function of a) neuron b) synapse c) supporting tissue, Review the organizationand function of a) cerebral hemispheres b) cerebellum c) spinal cord d) peripheral nerves e) pyramidalsystem f) extra pyramidal system. Review the factors influencing alpha motor neuron activity. Review theneurological basis of muscle tone and movement and demonstrate the following: a) hypertonia b)spasticity and rigidity c) ataxia d) athetosis e) chorea

B. Principles of Assessment

Review a) skill in history taking b) assessment of higher functions, cortical sensations, cranial nerves,dorsal column sensation and pain & temperature sensations c) assessment of motor function: grading ofmuscle power, assessment of range of movement, balance and coordination d) assessment of superficialand deep reflexes e) assessment of reflex maturation in terms of stimulus, position negative/positivereaction and their significance f) assessment of gait- both normal and abnormal (spastic, ataxic andparalytic patterns) Emphasis should be placed on teaching accurate assessment techniques and variousrecording methods e.g. color coding on body charts, graphs etc.

C. Principles of Treatment

Review the treatment principles as follows:-

Sensory re -education: hypersensitivity, hyposensitivity and anesthesia, Treatment of altered tone: hyper tonicity and hypo tonicity, Motor re-education: Strengthening exercise, coordination exercise, joint mobilization exercise, use of equilibrium and labyrinthine systems, use of PNF patterns, controlled sensory stimulation to bias the spindle cells e.g. Vibration, tactile, ice etc. use of stretch to elicit movement (facilitation), light joint compression (inhibition) use of rifle, activity to improve motor function, phylogenic sequence of motor behavior, Treatment to improve function: Free exercise, gait training with and without aids, activities of daily living, mat exercise, exercise for recreation, Review the use of ambulatory aids in neurological conditions: In spastic upper motor neuron lesions, In lower motor lesions, in dorsal column dysfunction and cerebral dysfunction, Review the use of splints and braces in spastic upper motor neuron and in flaccid lower motor neuron lesions, in both upper and lower limbs, Review the management of chronic pain in neurological conditions with respect to the type of pain, treatment modalities available, selection criteria for each modality and possible complications.

D. Cerebral Palsy

Define cerebral palsy and describe the topographical classification, monoplegia, diplegia, paraplegia, hemiplegia& tetraplegia, Describe types of cerebral palsy. Assess reflex activity at different levels: Cortical, mid brain, brain stem,spinal. Assess developmental milestones from birth to five years, Assess functional ability: Prone to supine(rolling) Coming to sitting, quadruped, crawling, kneeling, kneel-stand, stand with support and walking, Examine for contractures as follows: hip flexion,

adduction, internal rotation: Knee flexion: ankle plantar, flexion, inversion, eversion. Flexion contracture of elbow, wrist & fingers and spinal deformities, Treatment - Describe and demonstrate the treatment motor dysfunction: Passive movement, stretching ofsoft tissue tightness, use of ice to reduce spasticity, positioning the child to prevent soft tissue contractures,to inhibit abnormal reflexes and to facilitate volitional movement. Describe and demonstrate techniques ofcarrying of different type of CP children, encouraging bimanual activities in different starting positionslike prone sitting and standing and activities across the midline. Describe appropriate home programmesfor positioning the child, handling them and assisting improvement of function. Introduction to treatmenttechniques: Bobath, Rood.

E. Peripheral Nerve Lesions

Identify type of peripheral nerve lesions. Assess the motor 'system: Specific muscles. Range of motion,active and passive ranges, muscle girth. Assess sensory system: touch, pain, temperature, par aesthesia,nerve reverberation. Assess autonomic function: sweating, skin condition, soft tissue atrophy. Treatment:describe muscle reeducation techniques: electrical stimulation (selection of current): active, assisted,resisted movements: Passive and self assistive stretching and massage. Describe sensory reeducation andpain relief by various modalities; describe the common splints used peripheral nerve lesions. Static,dynamic and functional. Isolating muscle contraction, specific muscle strengthening.Post- Operative management: Pressure bandaging reeducation after transfer. Describe a home programme.

F. Neuro Muscular Diseases

1. Amyotrophic Lateral sclerosis: introduction, etiopathology, clinical sign & symptoms, impairments, disabilities,evaluation Procedure, physiotherapy management.

2. Demyelinating inflammatory polyradiculoneuropathies: Introduction, etiopathology, clinical sign & symptoms, impairments, disabilities, evaluation procedure & physiotherapy management.

3. Muscular Dystrophy: Describe stages of the disease: ambulatory, wheelchair and bed stages. Describe significance of exercise resisted, active and free. Identify and assess common contractures anddeformities. Assess range of motion and muscle power. Assess functional ability.

Demonstrate treatment program for strengthening weak muscles:

Active movements and hydrotherapy. Increase range of motion by suspension therapy, powder board, passive stretching positioning etc.

Demonstrate gait training with appropriate orthoses, Describe management of chest complication breathing exercises chest percussion, drainage of secretions and assisted coughing.

G. Basal Ganglion disorders:

Introduction to the function of basal Ganglion, relation with posture and movement.

i. Parkinsonism: Review the natural history, course and prognosis of the disease. Identify and assess problems in posture sitting, kneeling and standing balance, voluntary and automatic movements rigidity. Tremor and gait. Assess also hearing, speech and finger dexterity. Describe disability grading according to Yulu. Demonstrate treatment: postural awareness and relaxation training. Gait training techniques: associated reactions, heel-toe gait, overcoming obstacles, start and stop on command, turning and walking backwards, forwards and sideward. Describe an appropriate home exerciseprogramme.

ii.Huntingtons Diseases: etiopathology, sign& symptoms, stages, examination procedure,physiotherapist treatment goals and treatment techniques.

iii. Wilsons Diseases: etiopathology, sign& symptoms, stages, examination procedure, physiotherapist treatment goals and treatment techniques.

iv. Tardive Dyskinesia :etiopathology, sign& symptoms, stages, examination procedure, physiotherapist treatment goals and treatment techniques.

v. Dystonias :etiopathology, sign& symptoms, stages, examination procedure, physiotherapist treatment goals and treatment techniques.

I. Spinal Cord Lesions:

Describe types of spinal cord lesions. Describe sign of tract and root

Interruptions, Describe positioning of the patient in acute spinal cord injury, Describe assessment of themotor system: tone, power of specific muscle range of motion and limbs girth. Describe assessment ofsensory system and reflexes.Describe assessment of functional ability and balance reactions in appropriate cases. Describe assessmentof respiratory function. Muscles of respiration, coughing ability and vital capacity. Describe how thelevel of lesion is ascertained.Treatment: Describe the stages of immobilization & stage when weight bearing is allowed, Describespinal orthosis. Demonstrate motor reeducation programmes and programme for respiratory care in highlevel paraplegics and

quadriplegics. Demonstrate progressive ambulation, mat exercises, variousstrengthening programmes, methods of decreasing spasticity and improving sitting balance. Demonstrateparaplegic gaits and reeducation in functional activities: transfer and protective falling. Describecommon ambulatory aids used in paraplegics and common plints used .in tetraplegics. Describe the useof Hydrotherapy in paraplegics. Describe the concept of team approach in rehabilitation of these patients.

I. Hemiplegia:

Define hemiplegia and identify the following: Sensory disturbance, alterations in tone, loss of selective movement, loss of balance reactions and communications problems.

Treatment: Describe the unilateral and bilateral approaches to treatment. Describe positioning in the supine position, on the affected and on the unaffected sides. Demonstrate activities in the recumbent position arm mobilization. Trunk elongation-scapular movement, arm elevation, activities for a recovering arm: activities for the lower limb. i.e. hip and knee flexion over the side of the bed, knee extension with dorsi flexion, hip control, and isolated knee extension

Mat activities: demonstrate rolling on to affected and unaffected sides, sitting and kneeling. Describe the technique of making a patient sit passively and active assisted in sitting: Demonstrate Transfer Technique. Describe activities in sitting: equal weight transference on buttocks, shuffling on buttocks, weight transfer through arms balance reaction on trunk & head.

Demonstrate activities in the standing position : standing from plinth, from chair (assisted and independent), weight bearing an affected leg, knee, control in stand weight transfers forward, backward and side wards, Gait training and stair climbing. Describe tilt board activities in the lying and sitting positions. Describe additional methods of stimulation using verbal cues, ice, pressure & tapping.

Describe management of shoulder pain and shoulder hand syndrome. Identify and describe hemiplegics gait, identify synergy, Components and abnormal reflex activities. Demonstrate reeducation of gait, motor relearning techniques functional approach and use of orthosis.

J. CEREBELLAR LESIONS:

Identify and assess abnormal tone, decomposition of movement. Rapid alternate movements, Pleurothotonus, proprioception, dysmetria, posture and gait. Treatment: Demonstrate exercises for in coordination-Frenkel's and weighted exercises. Demonstrate techniques for reeducation of balance and equilibrium reactions by visual compensation. Describe use of appropriate aids far ambulation depending in the severity of affection - walker, elbow crutches, quadruped, walking sticks, etc.

K. POLIOMYELITIS & Post Polio syndrome:

Define poliomyelitis and review the stages in the disease -acute, recovery and residual paralysis. Describetreatment in the acute stage: heat chest care, positioning. Describe the assessment of a patient in therecovery stage: active and passive range of motion, soft tissue tightness, muscle power & spinal deformities. Demonstrate treatment in the recovery stage: muscle strengthening- progress resistiveexercises. Describe the role of suspension and hydrotherapy. Describe the treatment of soft tissue tightness by passive stretching, auto-stretching, pre-operative assessment of contractures: hip flexion,

TA contracture, knee flexion and foot deformities. Review orthotic aids commonly used the management of polio. Describe tendon transfer operations commonly performed. Describe functional retraining for self care, gait training and posture correction.

L. Multiple Sclerosis: etiopathology, sign& symptoms, stages, examination procedure, physiotherapy treatment goals and treatment techniques.

M. Balance & Vestibular Disorders: basic physiology and balance control, common vestibular disorder,assessment, therapeutic goals and treatment techniques.

Neuro surgery

Review of pathological changes and principle of pre and post operative management by physiotherapy of the following conditions.Common surgeries of the cranium & brain, Common surgeries of vertebral column & spinal cord, Common surgeries of peripheral nerves, Surgical interventions in traumatic head injuries.

Unit-XXI (PHYSIOTHERAPY IN CARDIO-RESPIRATORY) :-

Respiratory

Review of mechanism of normal respiration (rate, rhythm, use of accessory muscles), Chest examination, including auscultation, percussion, knowledge of various investigative procedures (invasive & non invasive) use in the diagnosis of various respiratory disorders. Chest deformities (Barrel chest, pigeon chest), Measurement: Chest expansion at different Levels, Techniques of physical treatment: Breathing exercise, Chest mobilization exercises Postural drainage, Huffing, Coughing, Percussion, Vibration & Chest Shaking, Review of the Pathological and principles of management by physiotherapy to the following conditions:

COPD, Asthma, Lung abscess, Bronchiectasis, Pleurisy and Empyema, Pneumonia, Bacterial Disease. Rheumatic fever, Carcinoma of respiratory tract, Paralysis of diaphragm & Vocal cords, Chest wall deformities, Principles of Intensive Care Physiotherapy, Aerosol Therapy, Humidification

Cardiovascular

Review of anatomy and physiology of the cardiovascular system, Knowledge of various investigative procedures, Physical assesment (invasive &non invasive) used in the diagnosis of 'various cardio vascular disorders, Review of pathological changes, Clinical presentation, Principle of management by Physiotherapy of the following conditions:

Hypertension, Hypotension, Aneurysm, Congestive Cardiac failure, Peripheral Vascular Disordes:
a. Atherosclerosis. b. Arteriosclerosis. c. Thrombosis. d. Embolism.e. Burger's diseases.
f. Thrombophlebitis.g. Phlebitis.
Gangrene, Lymphedema.

Thoracic Surgery.

Review of pathological changes and principle of pre and post operative management by physiotherapy of the following conditions:

Lobectomy, Pneumonectomy, Thoracotomy, Thoracoplasty, Endoscopy & Eye Hole surgeries, Corrective surgeries of congenital heart defects, Angioplasties, Blood vessel grafting, Open heart surgeries& Heart transplant.

Unit –XXIIIPhysiotherapy in General Medical & Surgical Conditions

General, Gynecology and Obstetrics and ENT.

Review of pathological changes and principle of pre and post operative management by physiotherapy of the following conditions: 1) Common abdominal surgeries. Including GIT, liver, spleen, Kidney, bladder etc. 2) Common operation of reproductive system, including surgical intervention for child delivery. Ante natal &post natal, physiotherapy. 3) Common operations of the ear, nose, throat & Jaw as related to physiotherapy. 4) Common organ transplant surgeries - heart, liver, bone marrow etc.

Wounds, Burns & Plastic Surgery.

Review of pathological changes and principle of pre and post operative management by physiotherapy of the following conditions: 1) Wounds, ulcers, pressure sores: 2) Burns & their complications. 3) Common reconstructive surgical proceedings of the management of wounds, ulcers, burns & consequent contractures & deformities.

Pediatrics.

A. Review the examination & assessment of a pediatric patient. B.Review of pathological change and principle of management by Physiotherapy of the following conditions: 1) Common congenital and acquired muscle skeletal disorders. 2) Common congenital and acquired neurological disorders (CNS & PNS) 3) Common heredity disorders. 4) Common nutritional, metabolic & vitamin deficiency disorders. 5) Cerebral palsy, myopathy and muscular dystrophies.

Geriatrics

A. Review of the examination &assessment of a geriatric patient. B. Review of pathological changes and principle of management by Physiotherapy of the following conditions: 1) Musculoskeletal disorders. 2) Cardiopulmonary disorders 3) Neurological disorders (CNS &PNS) 4) Injuries &accidents specific to the aged.

Skin & Psychiatric disorders

Review of the Pathological and principles of management by physiotherapy to the following conditions. 1. Common conditions of Skin-Acne, Psoriasis, Alopecia, Leucoderma, leprosy, Sexually transmitted diseases. 2. Psychiatric Disorders- Psychosis, Psychoneurosis, Senile dementia

Unit –XXIII (REHABILITATION ON MEDICINE) :- Introduction of Rehabilitation & History, Epidemiology of disability (Impairment, disability, phases of disability process, etc.), Principles of Rehabilitation & concept of team approach with rolls of each individual participant, Organization of Rehabilitation unit, Disability prevention evaluation & principles of Rehabilitation Management, Role of Physiotherapy in Rehabilitation (Preventive, treatment & restoration), Brief outline of Communication disorder & its implications on Rehabilitation process, Brief outline of psychosocial & vocational aspects of Rehabilitation, Introduction to Occupational therapy, Activities of daily living, functional assessment & training for functional independence, Brief outline of basic community medicine with special reference to community based Rehabilitation, infrastructure and role of CBR , Assessment of disability in rural & urban setups. Health care delivery system & preventive measures with specific reference to disabling conditions, Community education program, Application of Physiotherapy skills at community level with special reference to the need at rural level, Role of voluntary Organizations in CBR, National District Level Rehabilitation Program, Role of Physiotherapy in CBR,

Unit-XXIV (ORTHOTICS AND PROSTHOTICS) :- Introduction to surgical anatomy and various pathological deviations with respect to brace fitting, Rationale of prescribing Prosthetic and Orthotic devices, Types of Prosthetic and Orthotic devices: Spinal, Lower limb, and Upper limb, Checkout, usage advice, precautions, and follow-up, Walking aids and wheel chairs: prescription, usage advice, and follow-up.

Skill Instructor – Printing & Technology

1. Printing Processes and Printing Machines

- Introduction, classification and principles of various printing processes.
- Relief printing: Letterpress and Flexography.
- Planographic printing: Lithography, sheet-fed offset and web-fed offset.
- Intaglio printing: Gravure printing.
- Screen printing process.
- Tools and equipment used in various printing processes.
- Printing defects, their causes and remedies.

2. Printing Material Science

- Materials used in Printing Technology.

3. Paper, Board, Ink and Substrates

- Fibrous and non-fibrous raw materials used in paper manufacturing.
- Manufacturing and finishing processes of paper and board.
- Definition, ingredients and types of printing inks.
- Types and properties of printing substrates and inks.

4. Typesetting, Page Assembly and Imposition

- Typesetting techniques.
- Input and output devices used in typesetting.
- Page assembly and proofing.
- Imposition and planning.

5. Graphic Design and Typography

- Introduction to typography and selection of typefaces according to the printing surface.
- Colour theory, colour wheel and colour schemes.
- Dimensions of colour and colour measurement.
- Visual ingredients and principles of design.
- Preparation and stages of layout; dummy preparation.

6. Binding and Finishing

- Binding materials used in the press.
- Pre-forwarding and forwarding operations.
- Covering operations, including types and styles.
- Finishing operations.
- Binding defects; repair and rebinding of books.

7. Printing Surface and Plate Preparation

- Surface preparation of metals for plate making.
- Types of plates used in offset printing.
- Types of plates used in flexographic printing.
- Stencil preparation for screen printing.

8. Colour Reproduction

- Basics of Color
- Colour separation and colour correction.
- Quality-control tools in color.

9. Digital Printing

- Digital printing
- Electrophotography, inkjet printing.

10. Pre-press Technology

- Pre-press Printing Method
- Scanner operations.
- Colour Management Systems (CMS) and Raster Image Processing (RIP) of files.

11. Web Offset Technology

- Web-fed offset printing machines.
- Infeed unit, printing unit and delivery unit.

12. Green Printing and Packaging – Applied/Industry Awareness

- Green Printing processes
- Packaging-related substrates and packaging applications.
- Element of Packaging
- Green packaging Technology.

SKILL INSTRUCTOR (YOGA)

UNIT-I: Origin of Yoga, History and Development of Yoga; Etymology and Definitions, True Nature and Principles of Yoga. Introduction to Schools (Streams)of Yoga: Yoga Schools with Vedanta Tradition (Jnana, Bhakti,Karma and Dhyana), Yoga Schools with Samkhya-Yoga Tradition (Yoga of Patanjali) and Yoga Schools with Tantric Tradition (Hatha Yoga, Swara Yoga and Mantra Yoga) Elements of Yoga and Yogic practices in Jainism, Buddhism and Sufism. Introduction to human body according to Ayurveda, yogic mantra, listening to peace prayers and its effect on human body and health.

UNIT-II: Yogic nature of health, health and disease, Yogic nature of life and its relevance, Yoga is a complete medicine. Mental Health: Its meaning, concept, factors, importance of mental health in life and physical aspect. Role of yoga in developing better mental health.

UNIT-III: Effect of Yogic practice on various systems of the human body: Benefits of Shatkarma, effect of Yogasana, Pranayama and Bandha on respiratory system, circulatory system, skeletal muscular system, endocrine system.

UNIT-IV: Role of diet, sleep and Bramcharya (celibacy) in health. Yoga therapy: - Normal metabolism and diet. Dhatusamyata, disease examination of the patient: - History and test method.

UNIT-V: Yoga in Ayurveda – Introduction to Ayurveda, Nature of Yoga in Ayurveda, Definition, objectives of Ayurveda according to Ayurveda texts and Objectives and goals of Yoga according to Ayurved.

SKILL INSTRUCTOR -ELECTRICAL

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

Power Electronics

Introduction to power electronics and its applications; Power semiconductor devices: power diodes, SCR, DIAC, TRIAC, power MOSFET and IGBT – symbols, construction, working principles and characteristics; SCR triggering and commutation; Single-phase uncontrolled and controlled rectifiers; DC-DC converters (choppers): step-down and step-up operation; DC-AC converters (inverters): basic operation and types; AC voltage controllers and cycloconverters – basic principles; firing circuits, gate-drive and protection circuits; basic voltage and current waveforms; applications of power electronic converters in motor drives, battery chargers, renewable energy systems and electric vehicles.

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 circuit, Multiplexer, Demultiplexer, Schmitt trigger, Sample and hold circuits, A/D and D/A converters, 8085 Microprocessor: Architecture, Programming and Interfacing.

Skill Instructor -Civil

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; prestressed 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.

Surveying

Principles, objectives and classification of surveying; chain and tape surveying; compass surveying; plane table surveying; levelling, contouring and computation of reduced levels; theodolite surveying and traversing; measurement of horizontal and vertical distances and angles; calculation of areas and volumes; errors in surveying and their corrections; temporary adjustments and basic operations of surveying instruments; introduction to Auto Level, Dumpy Level, Total Station, GPS and DGPS; field booking and interpretation of survey data.

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 Meyerhof'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 sewage treatment, quantity and characteristics of wastewater. Primary, secondary and tertiary treatment of wastewater, effluent discharge standards. Domestic wastewater treatment, quantity and 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.

Fluid mechanics: Properties of fluids, including density, specific gravity, viscosity and surface tension; pressure and its measurement; hydrostatic pressure and Pascal's law; principles of fluid flow; continuity equation and Bernoulli's theorem; flow through pipes and open channels; measurement of discharge; basic concepts of pumps and hydraulic machines.