Annexure- A

Syllabus for the posts of Lecturer-I Civil Engineering(page 1-2)

1. **Engineering Mechanics and Structural analysis:**
   Concept of rigid body scalar and vector quantities, Laws of forces, moment, friction, centre of gravity, Moment of Inertia, simple machines, torsion, Bending moment and shear force in statically determinate beams. Simple stress and strain relationship. Stress and strain in two dimensions, principal stresses. Simple bending theory, flexural and shear stresses, unsymmetrical bending, shear centre. Buckling of column, combined and direct bending stresses. Mohr's Moment area method, Maculay's Method , Analysis of trusses. Castiglianio's Theorem I&II. Two hinged three hinged and fixed arches. Rolling loads and influence lines.

2. **Surveying:**
   Principles and classifications, chain surveying, compass surveying, levelling, tachometry, theodolite, traversing, contouring, plane table surveying, curves and Total Station Survey. Basic principles of photogrammetry and remote sensing.

3. **Design of Concrete and Steel Structures:**
   Ingredients of concrete, water cement ratio, properties of concrete, admixtures, special concretes, Non destructive tests, basics of mix design. Concrete design-basic working stress and limit state design concepts, analysis of ultimate load capacity and design of members subjected to flexure, shear, compression and torsion by limit state methods. Basic elements of pre-stressed concrete, analysis of beam sections at transfer and service loads, one way slab, two way slab.
   Riveted, Welded and Bolted connections. Design of tension members, compression members, steel beams, riveted and welded plate girders.

4. **Geotechnical Engineering:**
   Soil type and structure, properties, soil classification, three phase system, relationship and interrelationship, flow of water through soils, permeability & seepage, effective stress principle, deformation of soils, consolidation, compaction, shear strength characteristics, plate load test, SPT, Density control, Measurement of field density by core cutter and sand replacement method, soil exploration, bearing capacity and its methods. Types and selection criteria of foundations, design criteria for foundation. Pile foundation, Pile group action. Ground improvement techniques.

5. **Fluid Mechanics and Hydraulics:**
   Properties of fluids, hydrostatic pressure, measurement of pressure, flow measurements, flow through pipes, flow through open channels, hydraulic pumps, principle of conservation of mass, momentum, energy and corresponding equations, potential flow, applications of momentum and Bernoulli's equation, laminar and turbulent flow, flow in pipes, pipe networks. Concept of boundary layer and its growth. Uniform flow, critical flow and gradually varied flow in channels, specific energy concept, hydraulic jump. Forces on immersed bodies, dimensional analysis. Hydraulic turbines, types, classification, principles of hydropower development.

6. **Hydrology and Irrigation Engineering:**
   Hydrological cycle, precipitation, evaporation, transpiration, infiltration, hydrograph, flood frequency analysis, flood routing through a reservoir.

Water requirement of crops, Dams, Canals, canal head works and regulatory works, spillways – types and energy dissipation, cross drainage works, river training works, water-logging, drainage, ground water recharge, well hydraulics,

7. **Environmental Engineering:**
Demand of water, impurities in water, physical chemical and bacteriological analysis, conveyance of water, standards for portable water. Water treatment – coagulation, sedimentation, flocculation, chlorination, softening, removal of taste and odour.
Sewerage system – domestic and industrial wastes, separate and combined systems, flow through sewers, design of sewers. Sewage characterization – COD, BOD, DO, nitrogen , TOC. Sewage Treatment – Sedimentation tank, trickling filters, oxidation ponds, activated sludge process, septic tank, disposal of sludge.
Environmental impact assessment, air and noise pollution, pollution control acts.

8. **Transportation Engineering:**
Principles of highway alignment, classification and geometrical design elements and standards for roads. Pavement structure for flexible and rigid pavements – design principles and methodologies. Typical Methods of road construction and material standards for WBM, bituminous roads and CC roads. Surface and sub surface drainage arrangements. Traffic survey, planning, intersection, rotary, traffic signs and markings.
Railway Engineering- Gauges used, permanent way its components, Types of rails, creep, welding, Rail fixtures and fastenings, Signalling, Points and Crossings,
Bridge Engineering:- classification, substructure and superstructure, well foundation and pile foundations.

9. **Construction Technology, Planning & Management:**
Physical properties of construction materials with respect to their use in construction – Stone, Bricks, Lime, Cement, Mortar, Concrete, Tiles. Use of ferrocement, fibre reinforced cement concrete, high strength concrete. Principles of brick and stone masonry, types of plastering, pointing, flooring, roofing, building repairs.
Machinery for earthwork and concreting, factors for selection and operating cost of equipment.
Network diagrams, PERT-CPM, cost optimization and resource allocation, economic analysis, project profitability.

Annexure– B

Syllabus for the posts of Lecturer-I Electrical Engineering(page 1-4)

Electromagnetism, Electromagnetic Induction, Electrostatics: 5marks

Electromagnetism, Magnetic field due to a straight current carrying conductor and a solenoid and rules for finding its direction, force between two parallel current carrying conductors. Force on a conductor placed in the magnetic field, Series magnetic circuits, Concept of hysteresis loop and hysteresis loss.

Electromagnetic Induction; Faraday's Laws of electromagnetic induction, Lenz's law Fleming's Right and Left Hand Rule, Principle of self and mutually induced e.m.f , Energy stored in a magnetic field, Concept of eddy currents and eddy current loss ,coulombs law,gauss's law and its applications, capacitance

Circuit theory : 5 marks

Basic Electrical Quantities, DC Circuits, Ohm's law, Kirchhoff's laws and their applications Network theorems ,AC fundamentals & AC circuits, Power in Ac circuits , Power factor , Poly-phase Systems, Power Measurement

Batteries: primary and secondary cells, Working principle, construction and applications of Lead acid, Nickel Cadmium and Silver Oxide Cells. Charging methods, Testing, Care and maintenance, grouping of cells,

ELECTRONICS : 10marks

Semiconductor Theory, Semiconductor Diodes: operation, characteristics, types, applications of Bipolar Transistors, Transistor Biasing & Stabilization: operation , types , characteristics and stabilization Feedback in amplifiers, Types , Construction, operation, characteristics and applications of FET , Transistor power amplifiers, tuned voltage amplifiers, sinusoidal oscillators , wave shaping and switching circuits , operational amplifiers, Types, construction, operation, characteristics and applications of a MOSFET, Coupled Amplifiers

Material Science : 5 marks

Classification of materials into conducting, semi conducting and insulating materials ,Classification of conducting material as low resistivity and high resistivity materials, Low resistivity copper alloys: & their practical applications , Applications of special metals Silver, Gold, and Platinum etc

High resistivity materials and their applications , Superconductors and their applications,General properties of Insulating Materials: Electrical Properties ,Physical Properties, Thermal Properties,Chemical Properties , mechanical properties , Insulating Materials & their Applications: Plastics, Natural insulating materials and their applications, Gaseous materials, Magnetic Materials & special Materials: Thermocouple, bimetal, leads soldering and fuses

Electrical Measuring Instruments and Instrumentation: 5 marks

Concept of measurement and measuring instruments ,Types of electrical measuring instruments, construction working , errors , applications of Ammeters and Voltmeters, Watt meters and Energy meter (Induction type)

Maximum demand indicators, Meggar, Earth tester, Multimeter, Frequency meter (dynamometer type) single phase power factor meter (Electrodynamometer type). synchroscope , phase sequence indicator, tong tester ,Instrument Transformers CT ,

PT ,Electronic Instruments, LCR meters Cathode Ray Oscilloscope: Digital multi-meter,

Transducers and Measurement of nonelectrical Quantities: displacement and strain, force and torque, pressure, flow, level, displacement, temperature, Humidity, ph value

Electrical Machines: 17 Marks

DC Generators : construction and working principle, EMF generation , armature winding, commutator, excitation systems , voltage built up, Armature Reaction , Commutation, methods to improve commutation, Performance and characteristics of DC motors , back emf , Terminal voltage, Speed control , Starters , Applications, Losses in DC motors , Swinburne's test

Transformers: Construction , Working principle of a transformer, EMF equation, Transformer on no-load / on load and their phasor diagrams , Equivalent circuit, voltage regulation, losses ,efficiency, tests ,applications, scheduled Maintenance, Auto-transformer: working and applications, 3 phase transformers , Construction , accessories of transformers, transformer connections , parallel operation, Cooling of transformer

Synchronous Machines: construction and operation ,Generation of three phase emf and emf equation ,Armature reaction, Voltage regulation, parallel operation of alternators, Synchronous Motors; hunting and its prevention Rating , cooling and applications of synchronous machines

Induction Motors: construction , Principle of operation, Locking of rotor and stator fields, Rotor resistance, inductance, emf and current, Power flow diagram of an induction motor , torque, Torque-slip curve, Double cage rotor motor and its applications, Starting , testing , applications of 3-phase induction motors, cogging and crawling in Induction Motors. Single phase induction motors; Construction ,types ,characteristics and applications, universal motors, Single phase synchronous motors, Reluctance motor, Hysteresis motor

Control System: 5 marks

Control systems and Classification of Control Systems , Transfer function and impulse response , Characteristics equation of transfer function , Block Diagram Representation: Simple or canonical Form of Closed Loop System,

Signal flow graph representation: Properties of Signal Flow Graph, Methods to obtain Signal Flow Graph from system equations & Block Diagram, Masons Gain Formula, Time response analysis of control system and stability: Concept of Stability, Routh-Hurwitz Criteria for Stability.

Digital Electronics : 3 marks

Number systems, Binary and Hexadecimal addition, subtraction and multiplication, 1's and 2's complement methods of addition/subtraction , Gates , Boolean Algebra & Combinational Circuits

Flip-Flops, Shift Registers and Counters

Power system and protection : 17 marks

Power Generation: Main resources of energy, conventional and non-conventional Different types of power stations, thermal, hydro, gas, diesel and nuclear power stations. solar energy, bio-energy, wind energy etc

Economics of Generation: Fixed and running cost, load estimation, load curves, demand factor, load factor, diversity factor, power factor and their effect on cost of generation, Base load and peak load power stations, inter-connection of power stations and its advantages, concept of regional and national grid.

Transmission Systems: Layout of transmission system, selection of voltage for H.T and L.T lines, AC and DC for power transmission,Selection of insulators, conductors, earth wire and their accessories, Transposition of conductors and string efficiency of suspension type insulators, Bundle Conductors, sag, resistance, inductance and capacitance in a.c. transmission line, voltage regulation, and corona. Transmission Losses

Distribution System: Lay out of HT and LT distribution system, Constructional features of LT, HT (11 kV) underground cables/overhead lines , determine fault location in cables by Murray Loop Test, Varley Loop Test

substation and various auxiliaries and equipment associated with it. Power Factor , type of faults in both overhead and underground systems, Symmetrical/ unsymmetrical faults Analysis, symmetrical components, power system stability

Switch Gears: Purpose of protective gear, switch, isolator and circuit breakers. Construction and working of different Types of circuit breakers, MCCB, ELCB for distribution and transmission. Protection Devices: Fuses, Earthing, Neutral Grounding , Relays, static relays and their applications, Relays for generator & transformer protection, Buchholz relay for protection, Protection of feeders and bus bars, over current and earth fault protection.

Distance protection for transmission system, Relays for motor protection, Protection of system against over voltages, causes of over voltages, utility of ground wire, Lightning arrestors, rod gap, horn gap, metal oxide type, Transmission Line and substation protection against over-voltages and lightning.

Various types of tariffs: Concept of Tariffs, Block rate, flat rate, maximum demand and two part tariffs

Power Electronics and Drives : 12 Marks

Construction , working principles, characteristics ,applications , specifications of SCR, DIAC, TRIAC and Quadrac , heat sinks for SCR and TRIACS ,Methods of triggering a Thyristor. UJT, its Construction, working principles and V-I characteristics, UJT relaxation oscillator, Commutation of Thyristors, Series and parallel operation of Thyristors, protection of SCR. Controlled Rectifiers, Inverters , Choppers , Dual converters & Cyclo-converters.

Thyristor Control of Electric Drives: DC drives control ,Half wave drives, Full wave drives, Chopper drives ,AC drives control, Phase control, Variable frequency a.c. drives, Constant V/F application ,Voltage controlled inverter drives, Constant current inverter drives, Cyclo convertors controlled AC drives ,Slip control AC drives , Uninterrupted Power Supplies , UPS, Stabilizers, SMPS

Microprocessor : 5 marks

8085 pin diagram, Architecture and Bus organization , Register flags, Different addressing modes, instruction set, arithmetic and logic operations, 8085 assembly language programming, timing diagrams, Instruction cycle. Addressing techniques, , Partial and absolute address decoding, Basic interfacing concepts, interfacing input devices, interfacing

output devices, 8085 Interrupts, stack and subroutines. Interfacing peripheral devices, Multi-purpose programmable device (8155), Interfacing of different Devices, and its interfacing with 8085. 8086 architecture, addressing modes, Instruction set, Basic programming concepts, interrupts.

Utilization of Electrical Energy : 5 marks

Illumination: Nature of light, Luminous flux, solid angle, luminous intensity, illumination, luminous efficiency, depreciation factor, coefficient of utilization, space to height ratio, reflection factor, glare, shadow, lux ,Laws of illumination, construction , working and characteristics of different types of lamps. indoor and outdoor illumination levels , etc. Electric Heating, construction and working of different Heating methods. Electric welding. Principal , operation , applications of different welding methods ,Electrolytic processes and Electric circuits used in Refrigeration

Electric Drives: Characteristics of different mechanical loads, Types of motors used as electric drive, electric braking, Methods of power transfer by direct coupling by using devices like belt drive, gears, chain drives etc. selection of motors for different types of domestic, industrial and commercial loads, Specifications of commonly used motors , Energy conservation , Energy Efficient Devices

PLC &Micro controller: 3 marks

Architectural details of plc, Different programming languages, PLC manufacturer, Basic operation and principles of

PLC, Memory structures, I/O structure, Programming terminal, power supply. Instruction Set, Ladder Diagram

Programming, applications , Micro-controller Series (MCS-51): Pin details, i/o Port structure ,Memory Organization

Special function registers ,Timer operation, Serial Port operation, interrupts, Assemblers and Compilers, Assembler

Directives, Interfacing: 3 marks

keypad interface, 7- segment interface, LCD, stepper motor.Electric Traction System.

Introduction, System of Track Electrification , Track Mechanics ,Power Supply arrangement , Equipment used in and outside the Locomotive , Traction Motors and Traction Motor Control , Braking ,Train Lighting .

Annexure-C

Syllabus for the posts of Lecturer-I Electronics & Communication(page 1-4)

ELECTRONIC DEVICES AND CIRCUITS.

Semi conductor diode, Bipolar-transistors, Transistor biasing Circuits, Single stage transistor amplifier, Field effect Transistors, Multistage Amplifiers and power amplifiers Sinusoidal Oscillators,Tuned Voltage Amplifiers, Wave Shaping Circuits, Multivibrator Circuits, Operational Amplifiers

ELECTRONIC INSTRUMENTS AND MEASUREMENT

Measurement, method of measurement, types of instruments, Voltage, Current and Resistance Measurement, Cathode Ray Oscilloscope/ Digital storage oscilloscope, Signal Generators, AC Bridges and Q Meters, Ramp, Dual slope and Integration type digital voltmeter, digital multimeter, frequency counter, Transducers: Variable Resistance Type ,Variable capacitance type, Variable inductance type Instrumentation amplifiers, Graphic Recorder, X-Y Recorder

Analog and Digital COMMUNICATION

Amplitude modulation, Frequency modulation and Phase modulation,Amplitude Modulators and Frequency Modulators, Demodulation of AM and FM Waves Pulse code modulation and delta modulation, AM/FM Transmitters and Receivers, Antennas and their types, Ground wave propagation, sky wave propagation,Space wave communication, Satellite Communication, Basic block diagram of digital and data communication systems, common codes viz 5 bit Baudot code, 7 bit ASCII, ARQ, EBCDIC Code error detection and correction techniques, Amplitude shift keying (ASK),Frequency Shift keying (FSK), Phase shift keying (PSK), Quadrature Phase Shift Keying(QPSK), UART AND USART- Their need and function in communication systems ,Need and function of modems, low speed, medium speed and high speed modems. Modem interconnection, Modem data transmission speed, Modem modulation method, Modem interfacing (RS 232 Interface, other interfaces, Radio-telemetry: TDM and FDM telemetry system, PBX, PABX and EPABX, FAX system and its applications

DIGITAL ELECTRONICS

Number System, Codes and Parity,Logic Gates and Families, Logic Simplification using Boolean algebra and Karnaugh maps,Half adder and Full adder, 4 bit adder/subtracter circuit, design and implementation.

Decoders, Multiplexeres and De Multiplexeres, Latches and flip flops, Counters and Register A/D and D/A Converters

COMPUTER PROGRAMMING AND APPLICATIONS

Algorithm and Program Development, Program Structure (C Programming) I/O statements, Control Statements , Logical and relational operators; if-else, while, do- while, for loops, breaks, switch statements, Functions, Arrays, Pointers, Structures, Strings, Software Applications in Electronics Engineering viiz: ORCAD, PSPICE, Circuit Maker, MATLAB, Electronic Workbench

NETWORK FILTERS AND TRANSMISSION LINES

Two port (four terminals) network like symmetrical and asymmetrical networks,Balanced and unbalanced networks, T and π Networks, Attenuators: T, π and L type. Low pass, high

pass, band pass and band stop filters, Crystal Filters, Active Filters, Transmission Lines: T and π representation, infinite line, distorsion and attenuation of signal,loading methods, Reflection, standing waves ,standing wave ratio and stubs, Expression for voltage,current and impedance on the line.

POWER ELECTRONICS

Construction and working of Tyristors, DIAC, TRIAC & their V-I characteristics. UJT relaxation oscillator, Heat sink for thyristors, Application such as light intensity control, speed control of universal motors, fan regulator, battery charger, Controlled Rectifiers, Inverters, Choppers, Dual Converters and Cyclo converters, UPS and SMPS

MICROPROCESSORS

Architecture of a Microprocessor With reference to 8085 microprocessor,Programming with respect to 8085 microprocessor),Machine and assembly languages, Addressing modes, Programming in assembly language, Memories and I/O interfacing, Instruction Timing and Cycles, Various types ofInterrupts, Data transfer techniques,Peripheral devi

Audio vedio system

Various types of Microphones and Loudspeakers, Magnetic Recording,Digital RecordingOptical Recording (CD system and DVD), Monochrome TV- Elements of TV communication system, Scanning and its need, Need of synchronizing and blanking pulses, VSB, Composite Video Signal, Picture Tube, Camera Tube : Vidicon and Plumbicon, TV Receiver, Colour Television: Primary, secondary colours

Concept of Mixing, Colour Triangle, , Camera tube, PAL TV Receiver, NTSC, PAL, SECAM system. LCD and LED Television, Cable TV, DTH, HDTV.

MICROCONTROLLERS

Architecture of 8051 Microcontroller, Instruction Set; Addressing Modes, Interrupts, Assembly/C programming for Micro controller, Assembler directives, Assembler operation, Compiler operations,
De bugger,Simulator, Design and Interface like: keypad interface, 7- segment interface, LCD, stepper motor. A/D, D/A, RTC Interface, Application of Micro controllers in Communication System.

PROGRAMMABLE LOGIC CONTROLLERS

PLC, its operation and working principle, Architectural details – Processor, Memory structure, I/O Structure, Programming terminal, Instruction Set of PLC, Ladder diagram programming, Applications of PLCs viz Assembly, CNC Machines, Packaging, Process controls, Car parking, Doorbell operation, Traffic light control, Sorting of objects, Microwave Oven, Washing machine

COMPUTER NETWORKS

Networks Basics :Peer-to –peer Network, Server Client Network, LAN, MAN and WAN, Network Services,Topologies, Switching Techniques, OSI Model, TCP/IP ,Different classes of IP addressing, special IP address, Sub netting and super netting, IPV4 and IPV6 packet Format, Hubs, Repeaters, Multiplexers, Modems, Routers, Firewall, ATM, VOIP, Wireless MAN, Networking, Wireless LAN, Wi-Fi, WiMax(Broad-band Wireless) and Blue-Tooth technology.

OPTICAL FIBRE COMMUNICATION

Electromagnetic spectrum used, Advantages and disadvantages of optical communication, Principle of light penetration, reflection, critical angle, Optical Fibers and Cables,

. Losses in Optical Fiber Cable,
. Optical Sources viz Light Emitting Diode, Injection laser diode,

Optical Detectors like photo detectors used in optical communication; PIN diode and avalanche to diode (APD),

Wavelength Division Multiplexing), Modulation in fibre

VLSI SYSTEM DESIGN

Computer-aided design tools for digital systems. Hardware-description languages, VHDL, VHDL Statements, Combinational and Sequential Circuit Design using VHDL, Programmable logic devices like ROM, PLAs, GAL, PEEL, CPLDs and FPGA. FPAA (Field Programmes Analog Array)

DIGITAL SIGNAL PROCESSING

Classification of signals, discrete time systems, Linearity , Stability and Causality. Convolution and correlation of signals. Implementation of discrete time systems, Recursive and non-recursive FIR systems, Z-transform and its application to LTI systems, Design of Filter structures

Fourier Transform,Discrete Fourier transform, Fast Fourier Transform as applied to DSP Fast Fourier transforms: Efficient computation of DFT; FFT, DIT algorithm to IIR and FIR filters, Application of DSP baffles system

MICROWAVE AND RADAR ENGINEERING

Microwaves and their Classification on the basis of its frequency,
Microwave Devices viz Multi cavity klystron, Reflex klystron Multi-cavity magnetron, Traveling wave tube,Gunn diode and, Impatt diode, Different types of Wave guides, Microwave Components

Pulse radar. CW (Doppler) and FMCW radars, MTI radar. Radar display- PPI, *VSAT*

WIRELESS AND MOBILE COMMUNICATION

Wireless Communication: Electromagnetic waves,Frequency Spectrum used, Paging system, Cordless Telephone System, Cellular Telephone System, propagation considerations: Range, ,Atmospheric Effect, Geographic Effect, Fading, Doppler Effect.

Cellular Concept: Cell area, Capacity of cell, Frequency Response, interference, Power Control coverage and capacity improvement in cellular system

Multiple Access Techniques for Wireless Communication viz FDMA,CDMA, SSMA, FHSS, Mobile Communication System : Advanced Mobile Phone System (AMPS), Global Systems for Mobile Communication (GSM) and its architecture, GPRS and GPS System, DTH, Blue tooth, Wi-Fi and RFID

Annexure-D

Syllabus for the posts of Lecturer-I Automobile Engineering(page 1-3)

(1) I.C. Engines
(a) Laws of thermodynamics
(b) Air Standard cycles
(c) I.C engines working Principles
(d) Actual working of all mechanisms in I.C. engines
(e) Performance of I.C. engines
(f) I.C. engines testing
(g) Fuels and Combustion
(h) Supercharging
(i) Air- Conditioning in Automobiles

(ii) Gas Turbine
(a) Principle of gas turbine
(b) Gas turbine cycle
(c) Optimum pressure ratio for maximum cycle output
(d) Optimum pressure ratio for maximum cycle thermal efficiency
(e) Gas turbine cycles with heat exchange or re generator

(iii) Body , Chassis and Transmission
(a) Vehicle body design
(b) Chassis frame section
(c) Chassis side and cross member joints
(d) Body work and integral construction
(e) Vehicle components attachments and location
(f) Vehicle dynamics and suspension requirements
(g) Leaf springs
(h) Shackle arrangements
(i) Design of laminated springs
(j) Torsion bar
(k) Helical or coil springs
(l) Design of coil springs
(m) Independent rear suspension
(n) Relative pitch and bounce frequencies
(o) Single plate clutch
(p) Multi-plate clutch
(q) Centrifugal clutch
(r) Fluid couplings
(s) Determination of gear ratios
(t) Types of gear boxes
(u) Automatic transmission
(v) Epicyclic gear box
(w) Transmission shift and drive line features

(iv) Drive line and Differential
(a) Propeller shafts

(b) Universal joints
(c) Hotchkiss open type drive
(d) The differential
(e) Rear axle
(f) Front wheel drive
(g) Four wheel drive

(v) Front axle and Steering system
(a) Types of front hub assembly
(b) Front wheel alignment
(c) Vehicle steady state directional stability
(d) Steering systems
(e) Steering system components
(f) Power assisted steering
(g) Four wheel steering

(vi) Braking system
(a) Work done in braking
(b) Braking efficiency
(c) Tyre adhesion
(d) Theory of internal shoe brake
(e) Calculation of mean lining pressure and heat generation
(f) Disc brakes
(g) Mechanism of hydraulic braking system
(h) Vacuum assisted servo
(i) Compressed air assisted servo
(j) Hydraulic assisted servo

(vii) Vehicle vibration
(a) Vehicle vibration and human comfort
(b) Free vibration
(c) Forced vibration
(d) Vehicle vibration with single degree of freedom
(e) Vehicle vibration with two degree of vibration

(viii) Electric vehicles
(a) Description of electric vehicles
(b) Battery for electric vehicles
(c) EV performance and applications
(d) Charging of electric vehicles
(ix) Engineering materials
(a) Properties, Testing and Inspection of metals
(b) Ferrous metals and alloys
(c) Non- Ferrous metals and alloys
(d) Heat treatment of metals and alloys

(x) Elements of Workshop Technology
(a) Smithy and Forging
(b) Welding and related processes
(c) Plastics and their processing
(d) Bench work and fitting

(e) Limits , fits and surface quality
(f) Measurement and Inspection
(g) Working on CNC Milling and Lathe

(xi) Elements of Fluid Mechanics
(a) Fluid Properties
(b) Static Pressure
(c) Measurements of Pressure Head
(d) Hydraulic Pumps
(e) Hydraulic Devices

(xii) Elements of Mechanical Engineering
(a) Engineering Mechanics
(b) Laws of forces
(c) Centre of Gravity
(d) Moment of Inertia
(e) Friction
(f) Torsion
(g) Stresses and Strains
(h) Springs
(i) Vehicle in motion
(j) Flywheels
(k) Governors
(l) Design of Shaft and Keys
(m) Design of Automotive Parts
(n) Sensors and Mechatronics
(xiii) Engine emission control and management
(a) Major pollutants in SI engines
(b) Major pollutants in CI engines
(c) Sound Pollution and control
(d) Emission control strategies
(e) Crankcase emission control
(f) Evaporative emission control
(g) Exhaust emission control
(h) Catalytic Converters

Annexure-E

Syllabus for the posts of Lecturer-II (Non Engineering) Wood Technology (page 1-2)

WOOD CHEMISTRY:
Cell, structure of cell — cellulose - hemicelluloses -lignin , Wood Extractives, methods of extraction – effect of extractives on durability — Heartwood formation- Early wood and late wood. Destructive distillation of wood, distillation products, Natural defects of timber, Wood entomology Biological determination of wood — causes — classification of fungus, insects, marine borers and termites, heartwood and sapwood, pores and vessels, anatomical structure of wood, fibres; xylem, phloem

WOOD PHYSICS:
Determination of moisture content of wood by oven-dry method by moisture meter, determination of wood extractives and Lignin, Fibre saturation point, capillary movement, physical properties of wood, specific heat, calorific value, density, specific gravity, permeability of wood, electrical and dialectical properties, diffusion of water, porosity, types of wood, Specific heat, shrinkage, swelling, effect of moisture content on density, thermal properties of wood, anistropicity,

FOREST &FORESTRY:
Forest farming, Nursery raising, planting technique, Taxonomy, Plant nomenclature, Gymnosperms and angiosperms, Morphology of root- bark- stem- leaf- flower- fruit- seed- hard wood and soft wood exogenous and endogenous tress, softwood and hard wood, types of forest, different silviculture practices of commonly important timber species, botanical names of different species like deodar, kail, fir, walnut, chinar, willow

WOOD SEASONING:
Equilibrium moisture content, free moisture and bound moisture, Seasoning methods — air seasoning, kiln seasoning, chemical seasoning, seasoning defects — twist, cup, bow, split, check, honey combing, collapse, Stacking of timber and their methods, relative humidity, methods of storage, wood water relationship, recommended moisture content, behavior of seasoned timber in use, drying schedule, seasoning sheds, hygroscopicity of wood, energy conservation in drying processes, shrinkage of timber

WOOD PRESERVATION & LOGGING SAWMILLING:
Need of wood preservation types of preservatives — oil type, organic solvent type and water soluble type Preservation methods — pressure processes and non-pressure processes, thatching grass, bamboos. Protection of logs and storage, saw doctoring setting of saw teeth, saw blade geometry, natural durability of timber, methods of treatment of timber, brushing, spraying, dipping, steeping and diffusion, logging tools, log volumes and sawn material, prophylactic treatment for protection of logs in timber yard.

TIMBER MECHANICS AND ENGINEERING:
Physical and mechanical properties of wood, stress strain, Grading of timber, Impact bending, selection of timber species for structure, Prefabrication techniques, Glue laminated timber, wood and bamboo in earthquake resistance constructions, Timber joints and mechanical fasteners, design of linear structure timber components-Columns and trusses, Control of fire hazards in timber structures, elastic constants, modulus of elasticity, standard tests on timber

static bending- compression parallel to grain- nail and screw pulling,

WOOD COMPOSITE AND ADHESIVES:

Plywood, veneer, peeling, slicing, Preparation of wood for peeling and slicing, Veneer drying , dryers ,Jet dryer, Band dryer, roller dryer, Jointing, matching, pressing, cold press and hot press, sanding, Trimming, particle board, raw materials, classification and uses. Fiber board — raw materials — types, uses. MDF board - edge banding. Adhesives — adhesion — adherents — cohesion - glue – thermosetting resins - thermoplastic resins. Natural glues - synthetic glues - urea formaldehyde resin – Phenol formaldehyde resin - Resorcinol formaldehyde resin - melamine formaldehyde resin - epoxy resin.

Product design & fabrication:

concept of design- role of color, figure, texture, grains direction, use of solid laminated panels products, use of salvage wood, movement aspects of wood in design consideration, role of multiple joints, role of nails, screws, fasteners and dowels in product design and fabrication, concept of antique furniture, parquet flooring, Windsor chair, time motion studies, behavior of furniture, cabinets, wall panels, wooden floors. Decorative and stylish wood working, interactive materials and processing aspects of a design for quality for product, management process,, total quality management, work sampling, inventory control system

WOOD WORKING AND FINISHING:

Machines used in furniture section, Circular saw ,band saw, turning lathe, surface planer , thickness planer ,Jig saw, radial arm saw, router, Tenonning & mortising machine, sanding machine – portable machines. Hand tools Carpentry joints - lengthening, widening, corner and box joints, Furniture finishing paints , lacquers, oils and varnish, profile sanding, lacquering, wood carving, Different wood working & finishing operations, techniques of wood bending, dowels, wood carving tools, working qualities of timber, electrostatic- airless spraying equipment and powder coatings

Annexure-F

Syllabus for the posts of Lecturer-II (Non Engineering) Food Technology (page 1-2)

Introduction to Food Technology

Global, national, and local scenario of food production and consumption. Scope, importance, and constraints of food processing in India with special reference to J and K.

Classification of foods based on shelf life, pH, and origin. Different types of food spoilage viz: Microbial, physical, biochemical. Storage pests-Causal organisms and control.

Food Microbiology

Historical development in food Microbiology and its significance. Microbial spoilage of Milk and milk products (cheese, butter, ice-cream); Fresh fruits and Vegetables; Canned foods; Meat, fish, and poultry; Cereals and their products (Bread, Biscuits and Cakes). Useful Microbes in food and human health. Food borne diseases (Salmonellosis, Botulism, Listeriosis, Diarrohea, Dysentry and Eschrechia Coli).

Food Chemistry and Nutrition

Water content, water activity- Definition and its importance. Classification, Sources, functional and nutritional importance of: Carbohydrates; Proteins (Amino Acids) and, Fats and Fatty Acids. Sources, classification and functions of Vitamins and Minerals. Effect of Processing and storage on Vitamins and Minerals. Deficiency disorders and requirements of different Nutrients and energy. Concept of balanced diet. Interrelationship between health and Nutrition.

Principles of Food preservation

Preservation by use of Chemicals. Preservation by sugar and salt. Preservation by low temperature (Freezing, Refrigeration). Preservation by thermal processing (Blanching, Pasteurization, Canning, UHT) Preservation through moisture removal processes viz Concentration, Evaporation, Drying and Dehydration. Advanced food processing methods by use of electric field, high pressure, electromagnetic radiations, high intensity light and ultrasound waves.

Fruits and Vegetable Processing Technology

Maturity indices of different fruits and vegetables. Preparatory operations and related equipment- Pre cooling cleaning, sorting grading peeling coring and slicing. Ingredients and process for manufacture of Jams, Jellies, Marmalades, Preserves, Candies, Pickles and Chutneys. Tomato Processing- Ingredients and process for manufacture of tomato ketchup, sauce, puree, and paste. Juices – Raw material and processing for preparation of different fruit juices-Squash, Nectar, Cordial and Concentrate. Drying and dehydration of fruits and vegetables. Storage of fresh fruits and vegetables- Cold Storage, CAS, ZECC.

Cereal and Pulses Processing Technology

Wheat: Structure, Compositions, types of wheat, conditioning, types of wheat milling. Rice: Structure, Composition, Classification. Parboiling, Types of rice milling. Cooking quality of rice. Maize: Structure, Composition, Classification, Dry and Wet Milling. Pulses: Concept of anti-nutritional factors in pulses, Pre-treatment of pulses before milling. Milling of major pulses.

Milk and Milk Products Processing Technology

Milk: Sources, Composition and Nutritive value. Physico-chemical properties of milk.

Factors effecting quality of milk. Milk processing – Collection, chilling, tenderization and pasteurization and its effects. Milk products- preparation and storage of Curd, ice cream and Paneer. Butter and Ghee. CIP and COP System in dairy industry.

Meat, Fish and Poultry Processing Technology

Composition and Nutritive value of meat, fish, and poultry. Slaughtering methods of Meat and Poultry. Preservation of Meat, Fish and Poultry, Pickling, Smoking, Curing, Freezing, Canning, Drying and Salting. Egg: Structure, composition, nutritive value, and spoilage.

Bakery and Confectionery Technology

Raw materials and their role in bakery products. Types, preparation and quality evaluation of Bread, Biscuits and Cakes, Staling of Bread. Confectionery Products: Different ingredients and processes for making of candy, Chocolates and HFCS (High Fructose Corn Syrup). Reaction of sugars like caramelization, crystallization, and Hydrolysis.

Food Packaging Technology

Definition, Scope, and importance of packaging. Origin of packaging materials, types, properties, advantages, and disadvantages. MAP (Modified atmospheric packaging) and CAP (Controlled atmospheric packaging), Biodegradable and edible packaging, intelligent and active packaging. Package labeling-Functions and regulations. Packaging of different food products: Fruits and Vegetable, Cereals based products, Milk and Meat based products.

Food Safety and Quality

Definition, objectives, importance, and functions of Quality. Sampling-Definition, purpose. Sampling techniques, requirement, and procedures. Sensory and Quality Evaluation of foods. Concept of food adulteration (FSSAI, HACCP). Quality control, Quality Assurance, TQM (Total quality management). Agencies and standards (BIS, AGMARK, MoFPI, ISO and CAC).

Annexure – 4

Syllabus for the posts of Lecturer-II (Non Engineering) Garment Technology (page 1-3)

1. SUBJECT: TEXTILE SCIENCE

UNIT I

Concept of fibre, Identification of fibres- visual, Burning, chemical, microscopic. classification of Fibres- Natural and Synthetic fibres Properties of natural and synthetic fibre.

UNIT II

Introduction of Yarn- types of yarn and it properties ,Yarn processing of cotton, wool, synthetic , Twist- S Twist and Z Twist

UNIT I I I

Introduction of weaving- types of weaving, Types of looms — shuttle loom, conventional loom, automatic loom, Identification of weaving defects

UNIT IV

Fabric structure and properties, Fabric count, Balance of cloth, Textures and types, Identification of textures,Fabric shrinkage — causes, preventions and measurement

UNIT V

Introduction of non woven fabrics — Felting , bonding . Finishes — Classification , Basic finishes and Functional .

UNIT VI

Dyeing — process of dyeing (yarn dyeing , piece dyeing, Garment Dyeing),Direct dyeing, Chemical Dyeing,Colour Defects, Printing- methods and types of printing techniques

Printing defects.

2. SUBJECT: BASIC DESIGN

1 .Introduction of Elements of Art Lines — vertical lines, horizontal lines, Diagonal lines, zig -zag lines, curved lines and illusion created by lines.
2.Role of lines in our day to day life.
3.Basic shapes and forms, use of basic shapes in creating designs
4.Define colour- primary ,secondary, Tertiary colour
5. Define Hue , Value and intensity, Tints and shades
6. Role of colour wheel, colour scheme, monochromatic, complimentary, splitcomplimentary colour.
7. Role of warm , cool, opaquej transparent colours
8. Principles of Design hythm, Harmony, proportion, balance, emphasis
9. Introduction of Eight Head Theory
10. Role of Eight Head Theory in developing proportional measurements from the body
11. Concept of collage
12. Replica and enlargement.

3.SUBJECT: PATTERN MAKING

1 Introduction of standard measurement Methods of taking measurements (Direct and Indirect method) Classification of measurements.Terminology used in while making drafting. Precautions while taking measurements. Concept of ease.

2 Introduction of style interpretations and how it is done and what are its benefits.
3 Pattern making tools — different pattern making tools and its uses in pattern making
4 Pattern making — methods and principles

5 Normal and abnormal figure
6 Study of basic figure types- figure defects and their rectifications in developing patterns for them.
7 Drafting and producer of basic bodice block and sleeve block for Age = 3 years
8 Pattern details and producer of- collars, necklines, sleeves, yokes and pleats.
9 Drafting and producer of a basic bodice block and sleeve block for Bust 36 inches
10 Pattern styles of — Tops skirts and Trousers

4.SUBJECT: GARMENT CONSTRUCTION

11 Tools and equipments used in measuring ,marking, cutting , sewing and finishing of garments.
12 Sewing hand /Treadle and electric machine — its parts and functions of different components of sewing machines. Sewing defects and rectifications, maintenance of sewing machine.
Attachments- Tuckers, Hemmer, seam guide, binders, button hole, folders and trimmers, feed dogs, pressure foot.
13 Different types of garments manufacturing machines
Necessity of preventive, periodic and corrective maintenance
Types of lubricating oil used, maintenance scheduled for lubricating the machines.
14 Preparation of fabric cutting
a. Straightening the fabric
b. Shrinkinging the fabric
c. Ironing the fabric
4. Sequence for cutting
a. Laying out the pattern pieces, marking and transferring the pattern details.
b. Selection and Handling of special fabric while cutting and stitching
5. Different types of Hand stitches
Different types of machines seams
Constructions details- seam and seam finishes, fullness and its types, Gathers /Pleats,
Hem finishes, Plackets, fasteners and lining/facing.
6. Fitting- principles of good fit, Sequence of fitting, alterations to achieve good fit.

5. SUBJECT: CUTTING ROOM TECHNIQUES AND FINISHING PACKAGING

1. Fabric consumption estimation — How to plan a marker
a. Number of pieces in Garment
b. Number of Fabri
c. Nature/ hand of Fabric
d. Design/ orientation
e. Calculation of marker consumption
2. Spreading techniques — mode of fabric spreading
3. Spreading equipments - manual spreading techniques, Automatic Spreading Techniques
4. Cutting Equipments — circular knife cutter, vertical knife cutter, auto cut and maintenance of cutting equipment
5. Stain removal methods

6. Ironing factors- heat, moisture, pressure
7. Washing and dry cleaning- methods, equipment, stone washing, special washing
8. Pressing- purpose , categories of pressing — conventional and vacuum system
9. Folding- Flannel method, mechanical suiting size of bags / containers
10. Packing — types , packing materials and methods
    Sealing methods storage planning, stocking valuation, scheduling, transportation and insurance.

6. SUBJECT: CAD

1. Adobe Illustrator
2. Photoshop.

Annexure- 4

Syllabus for the posts of Lecturer-II (Non Engineering) Medical Lab Technology (page 1-6)

ANATOMY AND PHYSIOLOGY

- Introduction to human body, its anatomy and physiology
- Cell structure and function
- Lymphatic system
- Skin structure and function
- Sensory organs
- Excretory System
- Circulatory system
- Endocrine system
- Digestive system
- Reproductive system
- Connective tissues

CLINICAL MICROBIOLOGY

- Introduction to Microbiology
- Morphology of bacteria
- Bacterial cell wall , spores, flagella and capsules
- Bacterial growth and nutrition of bacteria
- Classification of bacteria
- Microscopy:- Principle, Types and their uses
- Sterilization:-Physical, chemical and sterilization control
- Bio Safety cabinet, safety rules (universal precautions) in a microbiology laboratory

- Bacterial culture, Culture techniques and Various Culture Medias
- Staining techniques: - Routine as well as Special techniques
- Identification of Bacteria:- Step care Approach
- Antibiotic sensitivity Methods ,Principle and clinical importance
- Role of clinical Microbiology in the Diagnostic Field
- Merits and Demerits of Cultural techniques over Non cultural Diagnostic Techniques
- Definition of pathogenicity, pathogenesis and virulence
- Sources and Types of infection
- Systemic Bacteriology
- Nosocomial Infection:- source and Control of nosocomial infections
- Laboratory diagnosis of :- U.T.I(Urinary Tract Infection), R.T.I (Respiratory Tract Infection),Enteric Fever
- Mycobacterium Tuberculosis
  Various automatic techniques for identification of MTB
- Collection and transportation of various clinical samples, for Culture – Urine, Stool, Sputum, Throat swabs, Pus and Pus swabs, Blood, Skin, Eye and Ear swabs and CSF.

- Significant Bacteriuria
- General characteristics, morphology,classification, Life Cycle and Lab.Diagnosis of:
- Protozoa and Helminthes
- Principle and application of concentration techniques of stool for demonstration of ova and cysts
- General Characteristics, Classification and Structure of viruses.
- Viral Transport Media (VTM) its use
- Lab diagnosis of :
- Hepatitis A, B & C.
- H.I.V
- H.S.V(Herpes Simplex Virus)
- Cultivation of viruses including cell line culture ,egg inoculation culture
- Tzanck smear
- Sellers stain
- Characteristics and classification of medically important fungi
- Fungal Culture media :
- SDA (Sabouraud's dextrose agar) with Various Modifications
- CMA (Corn meal agar)
- BHI (Brain Heart Infusion)
- BSA(Bird Seed Agar)

- Collection and procuring of sample for fungal infection in Skin, Nail and Hair

- KOH preparation,LCB (Lactophenol cotton blue),India ink
- Fungal Culture and identification of
- Yeast, Dermatophytes, Penicillium, Rhizopus, Mucor, Aspergillus
- Laboratory Diagnosis of Cryptococcosis
- Laboratory Contaminants
- Introduction to Immunology
- Immune and complement system
- Cells involved in immune system
- Organs involved in immune system
- Auto immune Antibodies
- Immunization /Vaccination ,types of immunity and vaccination
- Antigen, Antibody and complement
- Antigen- Antibody Reactions
- Various Serological Tests:- Agglutination, Precipitation and Flocculation reactions
- Complement Fixation :- ELISA with various modifications
- Molecular Technology
  PCR with various Modifications
  LCR (Ligase chain reaction)

HEMATOLOGY

- Haemopoeisis :- Erythropoiesis, Leucopoeisis, Thrombopoeisis
- Collection and preservation of blood :- venous and capillary
- Romanowsky stains: Theory and preparation
- Haemoglobin :- Synthesis of haemoglobin, function and its degradation, Types of haemoglobin
- White cell count:- Total Leucocyte Count ,Morphology of White cells
- Various counting chambers
- Quality Assurance in haematology
- Automation in haematology
- Erythrocyte sedimentation rate (ESR) and packed cell volume (PCV)
- Red Cell Indicies – MCV, MCH, MCHC
- Supravital stain and reticulocyte counting
- Reticulocytes
- Anemias :- Definition and classification
- Laboratory diagnosis of: Iron deficiency anaemia , Megaloblastic anaemia , Haemolytic anaemia , sickle cell anaemia and Aplastic anaemia.
- Red cell fragility
- Haemostasis:- Theories of blood coagulation, Platelets and their role in haemostasis

- Bone marrow:- Composition and function of bone-marrow,Aspiration of bone-marrow and clinical Significance of bone-marrow examination.
- Leukemia:- Classification (FAB),Laboratory diagnosis of various leukemias.
- LE Cell phenomenon
- Semen Analysis
- Cell counts of various biological fluids

CLINICAL BIOCHEMISTRY

- Introduction to clinical biochemistry:- Importance of clinical biochemistry, SI Units and their use,
- Instruments:-Balance(Analytical, electrical/electronic), Centrifuge, Colorimeter, Spectrophotometer
- Ion selective electrodes,Glucometer,Distillation Plant/Deionizer apparatus and Volumetric apparatus and their calibration
- Blood fractions :- Serum, Plasma, protein precipitating reagents and Preparation of protein free filtrate (PFF)
- Collection and preservation of various clinical specimens for bio chemical analysis
- Acid Base Balance
- Carbohydrate Metabolism :Glycolysis,Glycogenlysis,Glyconeogenlysis,Glycogensis and Glyconeogensis
- Renal Function , Liver Function
- Metabolism of protein
- Electrolytes and trace elements
- Quality Assurance in Biochemistry as per National Standards

- Enzymes
- Lipid Profile
- Blood Gases
- Urine Analysis :-Normal composition of urine Clinical importance of urine analysis, Qualitative analysis of proteins, sugar, bile salts, bile pigments, urobilinogen and blood.
- Glycosuria, albuminuria and Ketoneuria.
- Detection of Occult blood , Excess fat in stool and their clinical significance
- Biological fluids analysis :-peritoneal, pleural synovial & Cereberospinal Fluid
- Electrophoresis
- Chromatography
- Automation in Clinical Biochemistry
- Thyroid function Analysis
- Introduction to Tumor markers :-Commonly used Tumor Markers (C.A. Markers)

HISTOPATHOLOGY AND CYTOLOGY

- Preparation of Tissues: Unfixed and Fixed Tissue preparations
- Reception of Specimen:-Reception, recording, labeling and preservation of histological specimen
- Fixatives:- Composition, types and Classification of various fixatives
- Properties of various fixatives their Merits and demerits
- Tissue Processing : including Reception,Labelling ,Fixation,Grossing ,section cutting and Staining.
- Automation in Histopathology
- Microtomy
- Theory of staining (Routine):-Principle and mechanism of routine stain (Haematoxylin and Eosin)
- Mountants :-Various types of mounting media (aqueous, resinous)
- Special stains :-Principle, significance and interpretation of different types of stains
- PAS (Periodic Acid Schiff's Reagent) ,Silver impergnation stain – Reticulin fibre ,Ziehl Neelson's – for AFB and Leprae ,Masson's trichrome stain ,Oil Red O – fat ,Gram's stain – Gram +ve and Gram –ve
- Decalcification:-Process of decalcification,Various types of decalcifying agents,Their mechanism and applications
- Handling of fresh histological tissues (Frozen Section):-Reception and processing of frozen tissue ,Frozen section cutting,Staining ,Mounting of frozen section
- Museum Techniques:- Introduction to museum with emphasis on importance of museum , Reception, fixation and processing of various museum specimens, Cataloguing of museum specimen
- Cell:-Definition and function,Structure,Multiplication (Mitosis and Meiosis)
- Exfoliative Cytology

- Aspiration Cytology
- Cytological Staining:-Principle, Technique and interpretation of results
- Papanicalaou staining,May Grunwald & Giemsa staining,Haematoxylin and Eosin staining
- Cytological Fixatives
- Autopsy:-Introduction to autopsy technique (Care and maintenance of autopsy area, autopsy instruments, handling of dead bodies),Use of autopsy
- Malignant Cells:- Characteristics,Differences from normal cell
- Advancements in Cytology:- Automation in Cytology, Use of Cytospin

TRANSFUSION MEDICINE

- Historical introduction to Transfusion medicine (blood banking)
- Various blood group systems
- ABO Blood Group System:-Antigens and antibodies involved
- Various blood sub groups ($_{A1,A2}$, $_{A1}B$, $_{A2}B$)
- The Rh Blood Group System:- Antigen and antibody involved
- Anticoagulants used in blood bank:-Types and composition of various anticoagulants
- Criteria for selection of Donor
- Blood Collection and storage
- Screening of blood donor and characteristics of ideal blood donor, Blood collection procedure , Transportation and storage
- Cross Matching :- Types of cross matching, Various methods and their procedures
- Coombs Test :- Direct coombs test and Indirect coombs test
- Various blood components (Packed cells, Fresh frozen plasma, Cryoprecipitate, PRP(Platelet rich plasma)
- Preparation, Preservation and Uses
- Blood Transfusion reactions

MEDICAL LABORATORY MANAGEMENT

- Introduction, Layout, Facility of clinical Laboratory :-Role of medical laboratory technology in total health care, principles of management, techniques of planning, physical facilities/equipment – layouts and design

- Quality Assurance :-Analytical control, Internal and external quality assurance in clinical laboratories, precision,accuracy, standard deviation as per national standards

- Safety Precautions:-Safety measures in clinical laboratories (microbiology, haematology, biochemistry, histopathology and cytology, transfusion medicine),

- Disposal of Biomedical waste.
- First Aid in Clinical Laboratory:-Acid burn/Alkali burn,Accidental trauma,Gas/Toxic inhalation,Spillage
- Medical Ethics and Code of Conduct:-Ethics and code of conduct - legal aspects – confidentiality malpractice/ negligence; legal implications, law suits, consumer protection and insurance for professional health hazards
- Role of Computers in Laboratory
- Laboratory Accreditation – Introduction

Annexure – I

Syllabus for the posts of Lecturer-II (Non Engineering) Textile Designing (page 1-3)

1. **Textile Fibre Science**

   Classification of textile fibres, Physical and chemical identification of different types of fibres: silk, nylon, acrylic, polyester, viscose, jute, flax, wool, cotton. Source and production of various textile fibre their end uses and properties. Grading of cotton and wool, staple fibre, filament and filament yarn. Study of fibre cross section of different textile fibres. Moisture Regain and Moisture content of fibres, absolute humidity and relative humidity and their relationship.

2. **Yarn/ Spinning**

   Introduction to mixing and blending techniques. Principles of blow room, carding, drawing/gilling, speed frame, ring frame and doubling. Process flow of cotton, woolen, and worsted system of yarn manufacture. Insertion of twist S and Z twist. Type of package in spinning and doubling. Knowledge of standard yams, bulked yarn, core yarn, high tenacity yam, lustre yarn, tyre cord yarn, carpet yarn, stretch yarn, twist-de-twist yarn, spiral yarn, grindle yam, hosiery yarn. Various types of Yarn packages in Spinning

3. **Fabric / Weaving**

   Various yam packages and yarn faults. Process flow of fabric manufacturing Warp winding and weft winding, defects caused during warp winding and weft winding. Warping and sectional warping, methods of creeling, method of preparing warper's beam. Sizing, sizing ingredients and their functions Introduction to looms and their objectives, Nomenclature of different parts of looms and their functions. Loom motions (primary, secondary and auxiliary motions) Different types of sheds and their advantages and disadvantages. Introduction to different picking systems: (overpick and underpick). Beat up motions, Take –up motion, Let-off motion (Positive and Negative), warp protecting motion, warp stop motion, Dobby - keighley dobby mechanism & climax dobby , Jacquard-different types of jacquard, Drop box motion, Various types of Shuttle less loom, types of fabric defects. Various types of non woven fabrics. Working of carpet loom.

4. **Dyeing/ Printing/ Finishing**

   Classification and brief idea of dyes, process flow of textile chemical process, Pre treatment/Preparation of Material i.e. Fibre, yarn and fabric for Dyeing/Printing/Finishing, Dyeing of cotton with direct, reactive, vat, Azo, sulphur dye. Dyeing of wool/ Silk with acid, basic and Metal Complex dye. Dyeing of Polyester, Acrylic, and Nylon with different dyes. Union and cross dyeing. Fibre Dyeing machine (stock dyeing) Hank Dyeing and Beam dyeing /Cone or cheese Dyeing machine (package dyeing),Winch machine , Jigger machine, H.T.H.P. Beam Dyeing machine, Jet Dyeing machine. Effluent treatment in dyeing sector. Printing paste and its importance, Essential constituents of printing paste and their importance, different methods and style of printing. Printing of natural and synthetic fabrics. Resist style, Discharge Style and Transfer Printing. Classification of various types of Finishing, different types of mechanical finishes and chemical finishes along with their applications. Latest development in textile chemical processing

5. **Textile Testing and Quality control**
Random and biased sampling techniques, ISO, Quality Control, twist and its measurement, measurement of washing, rubbing, Dry cleaning, Chlorination, light fastness and perspiration testing, Air permeability test , microscopic test , solubility test , burning test for identification of various fibre, Weight per square meter of fabric, Blend test, measurement of crimp by crimp meter, Crease recovery tester, drape meter and its working, fabric stiffness tester, pilling of fabric by pilling tester, fabric strength tester, bursting strength tester, tearing strength tester, measurement of moisture regain, moisture content, relative humidity, Standard Laboratory Conditions Measurement of Moisture Regain by Drying Ovens and Electronic Moisture Meter. Fabric shrinkage and its measurement, water absorbency property of various fabrics, flammability tester and its measurement, abrasion resistance and its measurement, concept of serviceability and wear.

6. **Knitting**
Warp Knitting, Weft Knitting, Various types of knitting Needles and their applications, different types of warp and weft knitted structures and their derivatives, various types of weft and warp knitting machine their different parts and functions, fabric defects in warp and weft knitting, various types of warp and weft knitted design and their derivatives ,various types of knitting loops.

7. **Textile calculations**
Direct and Indirect yarn numbering system, calculation of count, Conversion of count from one system to another, Resultant Count, average count, fabric cover, warp cover, weft cover, GSM calculation, Take up percentage, Cloth calculation, crimp percentage, calculation of weight of warp and weight of weft, Jacquard Harness & design calculations

8. **Fabric Structure Design**
Different types of fabric structure, repeat size, repeat, drafting plan, lifting plan and denting plan, different types of drafting plan used in weave. Different types of weaves plain weave and its derivatives, twill weave and its derivatives, regular and irregular satin and sateen weave, diamond weave, diaper weave, Huck-a-back weave, honey comb weave, mock leno weave, bed ford cord weave, terry weave, pile weave (warp and weft), welts weave and its derivatives, pique weave, damask weave, crepe weave, colors and weave effect (birds eye effect, hound tooth effect, horizontal and vertical weave, etc), method of composing jacquard design, study of various types of fabrics (parachute fabric, drill, etc). Analysis of fabrics.

9. **Basic design/ Color & Texture/ Drawing and rendering**
Basic elements of drawing and design; and understanding of principles of designs – Rhythm, balance, harmony, unity, emphasis, proportion, colour combination etc to form a good design, construction of designs by using basic elements of drawing i.e. 'dot' and 'line' and using basic geometrical shapes, 3-dimensional effects in design, Drop design, half drop design, reverse drop design, stripes and check design, enlargement and reduction of design. different shapes of objects, opaque and transparent objects, glazed and rough surface; objects and use of different mediums, drapery, objects in nature like leaves, flowers, vegetables, fruits, dry twigs etc. design based on trees, toys, birds, buildings, monuments, birds feather, butterflies, etc. Different color theory, primary, secondary and Tertiary color as per different theory

Hue, value and intensity, Mono chromatic color scheme, achromatic color, polychromatic color, color wheel, contrast color scheme, analogous color, cool and warm color, complimentary color. Color measuring instruments.

10. Indian Traditional Textile Design

Indian traditional embroidered textile historical significance, construction technique style, texture, color, motif, kashmiri embroidery, Punjabi phulkari, himachal chamba rumal, bihar and Bengal suzni kantha, UP chikan kari, Orissa appliqué work, Karnataka kasuti, Gujarat and Rajasthan Block printing, different sarees of india, Resist dyed Textile, Ikat and Patola , Historical significance, style, motif of Pochampalli, Bandhani of Rajasthan and Gujarat Sarees, Brocades – Banaras, south Indian, Baluchar, Pathani, Tangail – Jamdani, Kani, Basoli and Jamawar Shawls, carpets and floor coverings, Historical significance and designs of Traditional Jewellery Design of India, Woven textile of eastern region

11. Computer Aided Textile Design

Latest Adobe photo shop and coral draw software, various tools of adobe photo shop and coral draw, Scanning of design, use of digitizer for design, different types of textile designing software auto tex, nanosoft, Textronics, ned graphics. Use of CAD to make textile design, graphic representation, file conversion, drawing simple geometric and other related design, capturing a multi-colour design picture using CCD/Scanner and modifying them, use of computer to match colour line for woven and printed in multi-colour designs.

Annexure – J

Syllabus for the posts of Lecturer-II (Non Engineering) Travel Tour & Hotel Management (page 1-4)

Unit-I

Basic Concepts in Tourism and Hospitality

Tourism terminology, Tourism typology.
Evolution of Tourism and Hospitality Industry.
Types of Tourism, components and elements of Tourism.
Types of accommodation, various departments of hotel, types of rooms, types of Plans.
New Trends and practices in Hotel management.
Travel motivators and travel deterrents.
Tourism organizations .

Unit-II

Tourism Infrastructure and Tourism activities.

Natural resources –mountains, valley, wildlife sanctuaries and national parks, deserts, lakes and Rivers.
Cultural resources – Indian culture and society, performing arts-dance and music forms.
Forts, Palaces, Monuments, Architecture.
International Hotel Chains, Restaurants, Fast food joints.
Amusement parts . Theme Parks, Casinos.
Transportation –Air, Land (Road, Rail, Cable), water Car rental companies.
Adventure tourism activities: Skiing, mountaineering, Kayaking, Canoeing, Gliding rock climbing.
Golf tourism
Cruise tourism.

Unit-III

History and Travel geography.

History of India –An overview.
History of Jammu and Kashmir.
Indian fairs and festivals.
Fairs and festivals of J&K.
Monuments of India under ASI.
Major religious and popular places of pilgrimage.
Geography, meaning and relevance in Tourism.
Physical geographical features of India.
International dateline, time zones.
Map reading; Tourist map of India; Road, rail and sea routes.

Unit-IV

Tourism and Hospitality Management.

Basic concepts, theories and approaches of management –nature, process, functions.
Management levels, managerial skills; social responsibilities.
Human Resource Development.
Organizational behavior.
Management trends and problems in tourism and hospitality industry.
Financial Management.

Auditing .night audit in hotel sector.
Event/ MICE management.

Unit-V

Tourism and Hospitality Marketing.

Evolution of marketing in tourism and hospitality industry.
Basic concepts of service marketing; service characteristics of travel and tourism; service marketing mix.
Market research.
Tourism and Hospitality market segmentation.
Product life cycle, product design --branding and packaging.
Measuring and forecasting of demand and supply.
Marketing communication, advertising, promotion and publicity.
Sales and personal selling.
Up-selling and discounts in Hospitality industry.
Linkages and channels of distribution.
Tourism trends.
Tourist satisfaction.
Relationship marketing.
Digital Marketing .
Culinary marketing.

Unit-VI

Eco-Tourism

Concept of eco-tourism.
Carrying capacity and sustainable tourism development.
Altemate forms of tourism.
Global code of Ethics for sustainable tourism.
Local Agenda 21.
Environmental act-Wildlife protection act, Forest protection Act.
Breathing tourism.
Community based tourism
Peace tourism
Spiritual tourism
Ecotel certification

Unit –VII

Tourism Impacts

Economic impacts
Cultural impacts
Socio cultural impacts
Environmental impacts
Positive and negative impacts of tourism
Environmental Impact Assessment

Unit-VIII

Automation in Tourism and Hospitality

Agency automation, computer reservation system.
Application of internet technology in tourism and hospitality.

e-marketing in Travel and hospitality
Travel portals.
Property Management system:Fidelio/IDS/Shawman etc.
M.I.C.E and automation.
Changing technology in tourism and hospitality services.

Unit –IX

Travel agency and Tour Operations.

Organization structure of a Travel agency and Tour Operator.
Functions of Travel agency and Tour Operator.
Ticketing, Cargo handling
Tour Packaging and Itinerary costing.
Documentation.
Requirements for setting a Travel agency.
Travel agency act.
Ethical, legal and regulatory aspects in tourism
National and International regulations for Tour operators/Travel agencies.
Law and legislationrelating to tourist entry, stay, depature, passport, VISA and health.
Tourist safety and security.

Unit-X

Hospitality Operations

Organization structure of Front office, Housekeeping, Food and Beverage service, Food and Beverage production department.
Duties and responsibilities of hotel staff
Interdepartmental relationship within the hostel
Reservations and changing trends
Innovations and changing scenario in housekeeping
Menu planning
Types of food service and service protocol
Restaurant/ Bar management
HACCP/ISO in Hospitality industry
Standard operating procedures in Hospitality Industry
Emergency response plan
Hospitality and related laws in India

Unit- XI

Entrepreneurship

Concept of Enterpreneurship
Qualities of an Entrepreneur
Personality development/ Generic skills for Entrepreneurship
Business Communication
Risk calculation and management
Scope for entrepreneurial ventures in tourism
Business ethics and business law
Entrepreneurial Support System
Various schemes for Entrepreneurs in Tourism and Hospitality Industry
Factors affecting future of Tourism business
Franchise opportunities in Hospitality industry

Unit XII

Research Methodology

Fundamental of statistics
Measures of central tendency

Research process
Research methods
Types of research
Types of data
Data collection and analysis
Sampling and its types
Hypothesis
Statistical testing
Interpretation and Report writing.

Annexure-K

Syllabus for the posts of Programmer (page 1-4)

COMPUTER PROGRAMMING USING 'C'

1. Algorithm and Programming Development
2. Program Structure
3. Control Structures
4. Functions
5. Arrays
6. Pointers
7. Structures and Unions
8. Strings
9. Files

RELATIONAL DATABASE MANAGEMENT SYSTEM (RDBMS)

1. Database System Concepts and Architecture
2. Data Modeling using E.R. Model (Entity Relationship Model)
3. Relational Model:
4. Normalization
5. Database Access and Security
6. MYSQL/SQL (Structured Query Language)

OPERATING SYSTEMS

Process Management Functions (Principles and Brief Concept); Job Scheduler, Process Scheduler, Process synchronization. Memory Management Function (Principles and Brief Concept); Introduction, Single Process System, Fixed Partition Memory, System Loading, Segmentation, Swapping, Simple Paging System, Virtual Memory. I/O Management Functions (Principles and Brief Concept); Dedicated Devices, Shared Devices, I/o Devices, Storage Devices, Buffering, Spooling. File Management; Principles and Brief Concept, Types of File System; Simple file system, Basic file system, Logical file system, Physical file system. Dead Lock; Condition for Dead lock, Dead Lock Preventions, Dead Lock Avoidance

DATA STRUCTURES

1. Problem solving concept, top down and bottom up design, structured programming, Concept of data types, variables and constants, Concept of pointer variables and constants
2. Arrays, Linked Lists, Stacks, Queues and Recursion, Trees.
3. Search algorithm (Linear and Binary), Concept of sorting, sorting algorithms (Bubble Sort, Insertion Sort, Quick Sort, Selection Sort, Merge Sort, Heap Sort) and their comparisons.

OBJECT ORIENTED PROGRAMMING USING C++

1. Fundamentals of object oriented programming – procedure oriented programming Vs. object oriented programming (OOP). Object oriented programming concepts – Classes, reusability, encapsulation, inheritance, polymorphism, dynamic binding, message passing, data hiding.
2. Review of constructs of C used in C++ : variables, types and type declarations, user defined data types; increment and decrement operators, relational and logical

3. operators; if then else clause; conditional expressions, input and output statement, loops, switch case, arrays, structure, unions, functions, pointers; preprocessor directives.
4. Classes and Objects
5. Member Functions
6. Overloading Member Functions
7. Inheritance
8. Polymorphism and Virtual Functions
9. File and Streams

SOFTWARE ENGINEERING

1. Size factors. Quality and productivity factors. Management issues, Models: waterfall, spiral, prototyping, fourth generation techniques, s/w process, Introduction to agile technologies.
2. Cost factors, cost estimations techniques. Staffing level estimation, estimating software maintenance costs, COCOMO.
3. Problem analysis, requirement engineering. The software requirements specifications (SRS), formal specifications techniques, characteristics of a good SRS.
4. Quality assurance work through and inspections static analysis, symbolic execution unit testing, formal verifications. Black box and white box testing techniques.
5. Definition of Quality, Quality Concepts, Quality Control, Quality Assurance, SQA Activities, Software Reviews, Inspections, Walkthroughs, Formal Technical Reviews, Review Guidelines, Quality Assurance Standards, ISO 9000, ISO 9001:2000, ISO 9126, CMM, TQM, TQM principles, Six Sigma, SPICE.
6. Risk Management and Configuration Management

COMPUTER NETWORKS

- Concept of network
- Models of network computing
- Networking models
- Peer-to –peer Network
- Server Client Network
- LAN, MAN and WAN
- Network Services
- Topologies
- Concept of switching
- Switching Techniques
- OSI Reference Model
- OSI Physical layer concepts
- OSI Data-link layer concepts
- OSI Networks layer concepts
- OSI Transport layer concepts
- OSI Session layer concepts
- OSI presentation layer concepts
- OSI Application layer concepts

Concept of physical and logical addressing

- Different classes of IP addressing, special IP address
- Sub netting and super netting
- Loop back concept
- IPV4 and IPV6 packet Format
- Configuring IPV4 and IPV6
- Network connectivity Devices
- NICs
- Hubs
- Repeaters
- Multiplexers
- Modems
- Routers and Routing Protocols
- Gateways, Amplifiers
- Firewall
- ATM
- VOIP and Net-to-Phone Telephony, Laws and Protocols
- Client/Server Technology
- Server Management
- RAID management and mirroring
- Hauffman codes
- Cryptography
- Basics of Wireless: Types of Wireless Networks, Wireless MAN, Networking, Wireless LAN, Wi-Fi, WiMax(Broad-band Wireless) and Blue-Tooth technology, Mobile Adhoc Network (MANET)
- Network Security, Introduction to basic encryption and decryption, concept of symmetric and asymmetric key cryptography, overview of DES, RSA and PGP. Introduction to Hashing: MD5, SSL, SSH, HTTPS, Digital Signatures.
- Computer Network Attacks: (6 hrs)
- Active Attacks, Passive Attacks, Stealing Passwords, Social Engineering, Bugs and Backdoors, Authentication Failures, Protocol Failures, Information Leakage, Denial-of-Service Attacks, Botnets, Phishing Attacks
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Java Programming

Java Virtual Machine (JVM), Java In Time (JIT) compiler, JDK

Working with data types, control flow statements, arrays, casting, command line arguments

Java Classes and Memory Management
Interfaces and Packages
Exception Handling and Stream Files
Threads and Multi-threading
Java Data Base Connectivity (JDBC)

INTERNET AND WEB TECHNOLOGIES

Telephone line, cable, leased line, ISDN, VSAT, RF link
World Wide Web and its evolution, web page, web server, HTTP protocol. Examples of web servers. Navigation Tools: Mozilla Firefox, Google Chrome, Internet Explorer, Uniform Resource Locator (URL). Hypertext, hyperlinks and hypermedia, URL, its registration, browsers, search engines, proxy servers

Basics of authentication and authorization. Introduction to firewall, various techniques of encryption and decryption, SSL (Secure Socket Layer)

VISUAL PROGRAMMING USING (.NET)

Introduction to .NET framework, feature of .Net framework, architecture and component of .Net, VB.NET Basics, Visual Basic .NET Programming Language-Variables & Data Type, Strings, Arithmetic Operators, Building the project, Common Control Controls, Functions Call and Arguments, Select Case, Loops, Nesting of Loops, Decision Structures, Error handling using Try.. Catch Block

Database Connectivity

Annexure – L

Syllabus for the posts of Foreman Engineering

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

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

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

Powder processing: Production of metal/ceramic powders, compaction and sintering of metals and ceramic powders.

Polymers and Composites: Plastic processing – injection, compression and blow molding, extrusion, calendaring and thermoforming; molding of composites.

Engineering Materials: Structure and properties correlation;engineering materials (metals, ceramics, polymers and composites) – properties and applications; stress strain behavior of metals and alloys;iron-carbon phase diagram, heat treatment of metals and alloys, its influence on mechanical properties.

Applied Mechanics: Engineering mechanics – equivalent force systems, free body concepts, equations of equilibrium; trusses; strength of materials – stress, strain and their relationship; failure theories, Mohr's circle(stress), deflection of beams, bending and shear stress, Euler's theory of columns.

Theory of Machines and Design: Analysis of planar mechanisms, cams and followers; governors and flywheels; design of bolted, riveted and welded joints; interference/shrink fit joints; design of shafts, keys, spur gears, belt drives, brakes and clutches; pressure vessels.

Fluids Engineering: Fluid mechanics – fluid statics, Bernoulli's equation, flow through pipes, equations of continuity and momentum, capillary action, contact angle and wetting; heat transfer – basic applications of conduction, convection and radiation.

Automobile : Introduction, Ignition System, Chassis and Suspension, Transmission system, Engine Parts, Braking System , Steering System, Lubrication & Cooling System , Preventive maintenance.

Thermodynamics: Thermodynamic systems and processes; properties of pure substances, behaviour of ideal and real gases; zeroth and first laws of thermodynamics, calculation of work and heat in various processes; second law of thermodynamics; thermodynamic property charts and tables, availability and irreversibility; thermodynamic relations. Applications: Power Engineering: Air and gas compressors; vapour and gas power cycles, concepts of regeneration and reheat. I.C. Engines: Air-standard Otto, Diesel and dual cycles.

Safety In Engineering Workshop: introduction, foundry operations safety in the use of power presses, safety in welding, cutting, finishing, cleaning, polishing, buffing safety in heat treatments - care and maintenance of common elements used in workshop.