Annexure - II
Topics of Presentation for Candidates appearing for Interview of Assistant Professor (Contract) under TEQIP-III

Group	Branch	Topics of Presentation
Geology +	Applied Geology Geology	– Influence of Chemical and Mineralogical Characteristics on Engineering Properties of Rock – Geological Carbon Sequestration – Metamorphism in relation to Plate Tectonics – Clay Mineralogy and their importance in paleoenvironmental reconstruction – Application of Remote Sensing in Mineral Exploration – Arsenic Contamination of Groundwater: Source, Factors and Remedial Measures – Coal Preparation – Fluid Inclusion as Geothermomety – Shear zone lithology, identification and its importance – Sequence Stratigraphy
Mechanical +	Automobile Engineering Mechanical Engineering	– CAD/CAM – Composite – Cryogenic – Fluid Mechanics – Machine Design – Mechanical Vibration – Mechatronics – Production Technology – Renewable Energy – Robotics – Thermal Engineering – Tribology
Production +	Production Engineering Industrial and Production Engineering	– 3D manufacturing – CAD/CAM/CIM – Material Handling Systems – Metal Forming Technology – Micromachining /Nano Machining – Non-traditional Manufacturing – Operations Management – Product Development and Design – Quality and Reliability Engineering – Rapid Prototyping/Rapid Manufacturing – Supply Chain Management – System Analysis and Industrial Engineering

Instrumentation +	Bio-Medical Engineering	– Biofeedback systems – Biopotential Measurement Instrumentation – Design and materials for cardiovascular stent – Electrical safety of medical equipment – Electrochemical transducers in biology and medicine – Enzyme-based biosensors – Fluid flow in blood circulation – Gait analysis – Methods of scaffold fabrication for tissue engineering – MRI Imaging System – Tissue response to implant surfaces
	Electronics and Instrumentation Engineering	– Biomedical Instrumentation – Control System – DCS/ Network Control System – Embedded system – Energy Harvesting – Industrial Instrumentation – Internet of things system Design – Micro and Nano Sensors – Optical Instrumentation – Sensors and Transducers
	Electronics Instrumentation & Control Engineering	
	Instrumentation Engineering	
Chemical+	Chemical Engineering	– Chemical engineering thermodynamics – Computational Fluid Dynamics – Fluid Flow – Fuels and Combustion – Mass Transfer – Process dynamics and control – Process heat transfer – Reactor Design – Separation Processes
	Bio-Tech Engineering	– Bioreactors for stem cell culture – Biostimulation and Biomodulation of living cultures – Cell growth kinetics – Computer aided drug designing – Gibbs free energy and reaction kinetics – Mechanism of cell death in eukaryotes – Next Generation Sequencing – Physiological basis of biological waste treatment – Production of recombinant proteins in E. coli – Protein folding and recombinant protein production – Transgenic animals – Types and modes of bioreactors

Chemistry	Chemistry	– Concept of color and magnetism in inorganic compounds – Concept of Chemical kinetics and Rate of a chemical reaction – Concept of Group theory and application – Electron transfer processes in biological system – Gibbs-Helmholtz equation and its applications – Heavy Metal ion toxicity and its remediation – Homogeneous and heterogeneous Catalysis and their application – Mechanism of Polymerization with examples – Metathesis and coupling reactions in organic chemistry – Nuclear magnetic resonance spectroscopy and its relevance to organic chemistry – Quantum chemistry and its application – Redox reactions and their biological relevance – Spectroscopic methods of analysis
Civil	Civil Engineering	– Structural Analysis – Design of RCC Structures – Soil Mechanics – Foundation Engineering – Highway Engineering – Railway Track Engineering – Fluid Mechanics – Irrigation Engineering – Water Supply Engineering – Sanitary Engineering
Computer Science +	Computer Science/ Tech Engineering Information Technology	– Automata and Formal Languages – Compiler Design – Computer Networks – Computer Organization and Architecture – Data Structures and Algorithms – Database Management systems – Microprocessors – Operating Systems – Principles of Programming Languages – Software Engineering
Electrical +	Electrical & Electronics Engineering	– AC Machines

	Electrical Engineering	– Control Systems
		– DC Machines
		– Electronic Circuits
		– Measurement and Instrumentation
		– Power Electronics
		– Power Systems
		– Renewable energy systems
		– Special Electric Machines
Electronics +	Electronics & Telecommunication/ Communication Engineering	– Analog and Digital Communication
		– Analog Integrated Circuits
		– Antennas and Wave Propagations
	Electronics Engineering	– Computer Architecture and Organization
		– Computer Networks and Protocols
		– Devices and Electronic Circuits
		– DSP
		– Electromagnetic Theory
		– Fiber optics and Optical communication
		– Microprocessors & Microcontrollers
		– Microwave Devices & Engineering
		– Network Analysis and Synthesis
		– Signals & Systems
		– Transmission lines
		– VLSI Design
		– Wireless & Satellite Communication
English	English	– Benefits of effective Communication
		– Communication in organizations
		– English as a Global Language
		– English can also be taught through the mother tongue
		– Intercultural communication
		– Language and communication
		– Teaching of English in India
		– The book that I like the most
		– Use of technology in the language classroom
		– Ways to improve reading and writing skills
Food Technology	Food Technology	– Functional and Nutraceutical Foods.
		– Edible and intelligent food packaging system.
		– Green Food Processing.
		– Novel encapsulation techniques' as delivery system.
		– Modeling and Simulation of Food Processing Technologies
		– Thermal Processing of Foods.
		– Biodegradable Packaging
		– Biosensors
		– Ready to Eat Food Products
		– Foods Laws

Mathematics	Mathematics	– Abstract Algebra – Complex Analysis – Functional Analysis – Integral Transforms – Linear Algebra – Number Theory – Numerical Methods – Optimization (Linear and Nonlinear Programming) – Ordinary and Partial Differential Equations – Probability and Statistics – Real Analysis – Topology
Metallurgy	Metallurgy	– Annealing of Plain Carbon Steel – Basic Oxygen Steel Making Process – Cold rolling of Aluminum Sheet – Continuous Casting Process of Steel – High Entropy Alloys – Iron-Cementite Phase Diagram : Construction and Interpretation – Martensitic Transformation – Possible Causes and Remedies Fatigue Failure of Metals – Sintering Behavior of Metallic Powders : Thermodynamic and Kinetic Consideration – Stainless Steel Making Process – Strengthening Mechanisms of Metallic Systems – Time Temperature Transformation (TTT) Diagram of Eutectoid Plain Carbon Steel
Mining Engineering	Mining Engineering	– Controlled blasting – Design of slopes – Environmental impacts of mining – Ground control instrumentation – Long wall mining in India – Mechanized bird and pillar mining – Mine closure planning – Mine fires – Mine valuation – Stopping methods for metal mining – Ventilation planning

| Physics | Physics | – Interference by division of wave front and division of amplitude.
– Fraunhofer and Fresnel diffractions.
– Polarization of light and detection and production of different types of polarized light.
– Special features of LASER with their applications.
– Population inversion and He-Ne and semiconductor LASER.
– Claussius Mossotti relation and its significance in dielectrics.
– Michelson's Marley Experiment and postulates of special theory of relativity.
– Galilean and Lorentz transformation relations.
– Mass energy relation and variation of mass with velocity.
– Characteristic of a superconductor and Meissner effect.
– Types of diffraction techniques for identifying the crystal structures.
– Different types of point defects and bonding in solids.
– Difficulties with classical physics and introduction to quantum mechanics.
– Schrodinger time dependent and time independent equations and particle in a box.
– Introduction to Classical and Quantum Statistics.
– Magnetic Properties of Solids
– Equation of continuity and Maxwell equations in integral and differential forms. |
| Textile + | Textile Engineering | – 3-D textiles and performs
– Air texturing
– Digital printing
– Dyeing with natural dyes
– Eco-friendly chemical processing
– Enzyme applications in wet processing
– Medical textiles
– Novelty finishes in textiles
– Recent advances in yarn manufacturing
– Structure-property relationship of staple spun yarns |

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