NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI

TEMPORARY FACULTY POSITIONS – 2018

IMPORATANT ANNOUNCEMENT

The syllabus for written test and detailed schedule of Written Test and Interview for each department is given below.

Visit periodically the Institute website **www.nitt.edu** for the **announcement of shortlisted candidates for written test** and other updates/change, if any.

Written Test and Interview Schedule

Written Test Venue : CSE 301, 302

Interview Venue : Senate Hall, Administrative Buildings

Department	Written Test	Interview
Architecture	Date: 13/07/2018 Time: 10.00 AM – 12.00 Noon	Date:13/07/2018 Reporting Time: 01.00 PM
Computer Applications	Date: 13/07/2018 Time: 10.00 AM – 12.00 Noon	Date:14/07/2018 Reporting Time: 08.30 AM
Computer Science and Engineering		Date:14/07/2018 Reporting Time: 09.30 AM
Production Engineering	Date:14/07/2018 Time: 10.00 AM – 12.00 Noon	Date:15/07/2018 Reporting Time: 08.00 AM
Mechanical Engineering		Date:15/07/2018 Reporting Time: 12.30 PM
Metallurgical & Materials Engineering		Date:15/07/2018 Reporting Time: 03.00 PM
Physics	Date:15/07/2018 Time: 10.00 AM – 12.00 Noon	Date:16/07/2018 Reporting Time: 08.30 AM
Management Studies		Date:16/07/2018 Reporting Time: 10.30 AM
Humanities & Social Sciences (English)		Date:16/07/2018 Reporting Time: 12.30 PM
Humanities & Social Sciences (Economics)		Date:16/07/2018 Reporting Time: 02.00 PM

Registrar

<u>SYLLABUS FOR WRITTEN TEST</u>

1. ARCHITECTURE DEPARTMENT

1. Building Construction and Materials
2. Building Services (Water supply and Drainage, Lighting, Air-conditioning, Fire, Electrical and Mechanical Services)
3. Professional Practice
4. Bye-laws and Construction Management
5. History/ Contemporary Architecture
6. Energy Efficient/ Green Buildings
7. Urban Planning
8. Urban Design
9. Landscape Architecture
10. Environmental issues
11. Sustainable Practice
12. Digital Architecture

2. COMPUTER APPLICATIONS:

1. Computer Organization and Architecture
2. Data Base Management Systems
3. Operating Systems
4. Computer Networks
5. Programming Languages
6. Data Structures and Algorithms
7. Software Engineering

3. COMPUTER SCIENCE & ENGINEERING

1. Data Structures and Algorithms

Development of Algorithms - Notations, Concepts - Arrays - Linked lists - Stacks and queues Trees - Tree Traversing - Operations on Binary Trees – Sorting and Searching techniques - Graphs - BFS, DFS - Shortest path problems.

2. Operating Systems

Basic OS Concepts - Thread and process scheduling - Synchronization - Semaphores - Critical regions - Deadlock prevention and recovery - Memory Management - File Management - I/O Management – Case Studies on Windows and Linux OS.

3. Computer Organization and Architecture

Basic structure of Computers **-** Arithmetic - Addition & subtraction of signed numbers - Multiplication - Integer division - Floating point operations - Pipelining - Multiple bus organization - Micro programmed control – Hazards - Memory System - Semiconductor RAM memory - Cache memory - Virtual memory - Secondary storage - I/O Organization - Interrupts - DMA - Buses - Interface circuits - Serial communication links.

4. C Programming

C programming – Memory Concepts – Arithmetic Operations - Control Statements – Functions - Pointers – Structures – User Defined Data types - File handling.

5. Microprocessors

8085 processors - Architecture - Bus organization - Registers - ALU - Instruction set of 8085 - Instruction format - Addressing modes - System design using controllers - Microprocessor Interfacing Techniques - Segmented memory concepts - Bus concepts.

6. Computer Networks

Goals of networking, well-known applications such as email, ftp, and need for layered architecture OSI and Internet. Hosttohost communication: RS 232 over serial line; handshaking and error handling; packet switching; reliable transmission stops and wait, sliding window; logical connections. Multiple collocated hosts: addressing, LAN access methods; CSMA/CD, Ethernet, Token passing.

4. HUMANITIES & SOCIAL SCIENCES

ECONOMICS

Demand – Market Demand – Elasticity of Demand – Supply – Elasticity of Supply – Cost and Revenue Analysis – Market Morphology – Break Even Analysis.

National Income – Keynesian Theory of Employment – Multiplier – Accelerator – Trade Cycle – Inflation – Philip's Curve – Exchange Rate Determination – Balance of Payment and Trade – Shifting and Incidence of Taxes.

Probability Distributions – Sampling – Testing of Hypotheses – Regression Analysis – (with special reference to R^2) Adjusted R^2 – Error term – Time Series – (with special reference to Unit Root, Co integration tests) – Vector Error Correction – Causality Test.

ENGLISH
Literature

Chaucer to the 20th Century - Contemporary British Literature - American and other non-British Literatures - European Literature - Indian writing in English and Indian Literature in English translation - New Literatures in English - Commonwealth Literature- Literary Theory and Criticism.

Linguistics and Applied Linguistics

Language and linguistics – Relevance of linguistics to language teaching - Language acquisition and learning – Behaviourist and Cognitivist schools - L 2 Acquisition and learning – Theories of SLA and SLL - Theories of language teaching - English for specific purposes - Evaluation methods and testing techniques - Teacher orientation and training – Computer Assisted Language Learning.

5. MANAGEMENT STUDIES

Introduction to Production Management History of Production Management. Technology Management: Forecasting — Environment – product Design & Development Process Planting - Types of Production System - Tools for selecting the process.

Plant Locations and Layout Plant location: Factors to be considered- Multi Plant Location - Evaluation of Factors using Rations plan & Cost Analysis - Plant location trends. Plant Layout: Types of Layout - Quantitative analysis in plant layout Material Handling — Principles.

Job design techniques Job design: Scientific Method - Job Enrichment - Job Enlargement - Working Condition — Safety.

Job evaluations methods Job Evaluation. Work Measurement: Time Study - Work Sampling.

Materials management Purchasing and Warehousing Functions - Vendor Development and Rating. Value Analysis.

Building a strategic framework to analyse supply chains, Fundamentals of Supply Chain Management, Supply chain networks, Integrated supply chain planning, Decision phases in s supply chain, process view of a supply chain, supply chain flows, Overview of supply chain models and modeling systems, Supply chain planning: Strategic, operational and tactical, Understanding supply chain through process mapping and process flow chart.

Designing the supply chain network Supply chain strategies, achieving strategic fit, value chain, Supply chain drivers and obstacles, Strategic Alliances and Outsourcing, purchasing aspects of supply chain, Supply chain performance measurement: The balanced score card approach, Performance Metrics. Planning demand and supply: Demand forecasting in supply chain, Aggregate planning in supply chain, Predictable variability.

Planning demand and supply in a supply chain Planning and managing inventories: Introduction to Supply Chain Inventory Management. Inventory theory models: Economic Order Quantity Models, Reorder Point Models and Multiechelon Inventory Systems, Relevant deterministic and stochastic inventory models and Vendor managed inventory models.

Designing and planning transportation networks Distribution Management: Role of transportation in a supply chain - direct shipment, warehousing, cross-docking; push vs. pull systems; transportation decisions (mode selection, fleet size), market channel structure, vehicle routing problem. Facilities decisions in a supply chain. Mathematical foundations of distribution management, Supply chain facility layout and capacity planning,

Revenue Management Role of Pricing and Revenue Management in a Supply Chain; Pricing and Revenue Management for Multiple Customer Segments; Pricing and Revenue Management for Perishable Assets; Pricing and Revenue Management for Seasonal Demand; Pricing and Revenue Management for Bulk and Spot Contracts. Role of IT in Pricing and Revenue Management

6. MECHANICAL ENGINEERING

MATHEMATICS

Differential equations/calculus, statistics, reliability functions, Fourier equations, transfer functions

THERMAL SCIENCES

Fluid properties; fluid statics, manometry; Bernoulli's equation; dimensional analysis; viscous flow of incompressible fluids, boundary layer, flow through pipes, head losses in pipes, bends and fittings.

Modes of heat transfer; one dimensional heat conduction, resistance concept and electrical analogy, heat transfer through fins; unsteady heat conduction, lumped parameter system, free and forced convective heat transfer, heat exchanger performance, LMTD and NTU methods; radiative heat transfer, Stefan Boltzmann law, Wien's displacement law, black and grey surfaces.

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.

DESIGN

Free-body diagrams and equilibrium; trusses and frames; virtual work; kinematics and dynamics of particles and of rigid bodies in plane motion; impulse and momentum (linear and angular) and energy formulations, collisions.

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

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

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

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

INDUSTRIAL SAFETY ENGINEERING

Fire and explosion safety, Safety Management and safety in material handling

7. METALLURGICAL & MATERIALS ENGINEERING

Crystallography, Phase diagrams, Fe-C equilibrium diagram, CCT and TTT diagrams, heat treatment - Deformation mechanisms, tensile, compression, hardness, fatigue, and creep - general concept and testing methods - Basic thermodynamic concepts - Iron and Steel Making, Extraction of Copper, aluminum, Magnesium, Zinc and Titanium - Optical and electron microscopy and Xray diffraction techniques.

8. PHYSICS

Mathematical Physics: Determinants and matrices – Vector analysis – Complex analysis – Ordinary differential equations – Fourier analysis.
Classical Mechanics: Lagrangian formulation – Central force problem – Hamiltonian formulation – Rigid body motion – Special theory of relativity.
Quantum Mechanics: Schrodinger Equation – Operators and eigenfunctions – solvable problems – angular momentum and spin – approximation methods – scattering theory.
Electronics: Network analysis – semiconductor devices – amplifiers and oscillators – operational amplifiers – digital circuits.
Electromagnetic Theory: Electrostatics – Magnetostatics – Maxwell equations – Electromagnetic waves and propagation.
Statistical Mechanics: Thermodynamics – Ensemble theory – Maxwell-Boltzmann statistics – Bose-Einstein statistics – Fermi-Dirac statistics.
Solid State Physics: Crystal structure – Lattice vibrations and thermal properties – conductors – semiconductors – dielectrics – magnetic materials.
Atomic and Molecular Physics: Atomic spectra – resonance spectroscopy – IR and microwave spectroscopy – electronic spectroscopy.
Nuclear Physics: Nuclear forces – nuclear models – radioactivity – nuclear reactions – elementary particles

9. PRODUCTION ENGINEERING

ENGINEERING MATHEMATICS:
Linear Algebra, Calculus, Differential equations:
Complex variables: Probability and Statistics: Numerical Methods:

GENERAL ENGINEERING: Engineering Materials: Applied Mechanics: Theory of Machines and Design:

PRODUCTION ENGINEERING: Metal Casting: Metal Forming: Metal Joining Processes: Machining and Machine Tool Operations: Tool Engineering: Metrology and Inspection: Powder Metallurgy: Polymers and Composites: Manufacturing Analysis: Computer Integrated Manufacturing

INDUSTRIAL ENGINEERING: Product Design and Development: Engineering Economy and Costing: Work System Design: Facility Design: Production Planning and Inventory Control: Operation Research: Quality Management: Reliability and Maintenance: Management Information System. Intellectual Property System.