Educate Elevate Enlighten

JSS Mahavidyapeetha

JSS Science And Technology University

(Established Under JSS Science and Technology University Act No. 43 of 2013)

(Formerly Known as SJCE)

JSS SCIENCE AND TECHNOLOGY UNIVERSITY MYSURU

Department of Mechanical Engineering
&
Industrial & Production Engineering

Syllabus for M.Sc. (Engg.) and Ph.D. Entrance Exam - 2019

Design Engineering

Strength of Materials: Stresses in mechanical members.

Kinematics of machines: mechanisms, links, degrees of freedom, analysis of mechanisms, four bar chain mechanism, slider crank mechanism, Mechanical vibrations.

Dynamics of machines: static force analysis, dynamic force analysis, friction, balancing of rotating masses, balancing of reciprocating masses, gyoroscope and governors.

Material: Heat treatment of Metals-Annealing, Normalizing hardening, tempering, carburizing, cyaniding, Nitriding, and flame hardening, Iron, Carbon equilibrium diagram.

Composite Materials – Types, FRP & MMC advantages & applications.

Design of machine elements: stress analysis, type of loads, Design for Static Strength, static strength, stress concentration factor, Types of fatigue loading, uni-axial and combined fatigue loading. Types of impact load, design of fasteners and permanent joints. Design of gears and bearings

Thermal Engineering

Thermodynamics: Laws - Zeroth, first and second, entropy, pure substances, ideal gas, real gas, air standard cycles and vapour power cycles, compressors, refrigeration and air conditioning, IC engines: working and performance parameters.

Heat transfer: steady state conduction, forced and free convection, radiation,

Fluid mechanics: Properties of Fluids, Fluid Statistics and Buoyancy, Fluid Kinematics and Fluid Dynamics, Fluid Flow Measurements and Flow through pipes, Laminar flow, compressible flow and Flow past immersed bodies, Energy Transfer in Turbo Machines, Hydraulic Turbines, Centrifugal and Axial Pumps, Steam Turbines.

Manufacturing Process / Science

Welding process: Definition principles of welding, classification of welding applications of merits and demerits of welding. Arc Welding- Principle of Arc welding, Metal arc welding (MAW).Gas welding- Principle of gas welding, or Oxy - Acetylene welding, chemical reaction of gas welding, gas cutting & types of gas cutting machines.

Special Types of welding- Resistance welding, Principle of resistance welding, types of resistance welding- seam welding. Friction Welding-Explosion welding, Thermal Welding Laser welding, **Principles of soldering brazing and adhesive bonding:** Different types of soldering brazing adhesive bonding methods Inspections of Testing of welding

Theory of Metal Cutting: Single point cutting tool nomenclature, geometry, orthogonal and oblique cutting, Mechanism of chip formation, types of chips, Merchant circle diagram, shear angle relationship.

Tool Life & Tool wear: Types & Forms of Tool Wear and tool failure & effects of cutting parameters, Tool life criteria, Taylor's tool life equation, and problems on tool life,

Cutting Fluids: Types & properties of cutting fluids and selection. Effects of cutting fluids on Machinability

Turning Machines: Introduction, types of lathes –Capstan & Turret Lathes, comparison of lathes, constructional features, operations, different methods of taper turning, apron mechanisms, gear combination calculations for thread cutting, work holding & tool holding devices

Drilling Machines: Classification, constructional features, Radial and Pillar drilling machines, operations of drilling machines with counter sinking and counter boring operations, nomenclature of a twist drill bit and reamer, applications.

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Non-traditional machining processes: Principle, need, equipment, operation Electro Discharge Machining Electro chemical machining, ultrasonic machining, Abrasive let machining,

Engineering Management

Operations and Production Management

Linear Programming; Transportation Problems; Queuing theory; Game theory; Project Management; Forecasting; MRP; Scheduling problems

Organizational Behavior and Human Resource Management

Overview, Objectives, competitive advantage, skills required. H.R. Policies, conceptual framework; Experimental studies in Organizational/industrial psychology; concepts in Learning, Perception, Motivational theories; group dynamics in organizations; Theory and types of leaderships; organizational communication.

Total Quality Management and SQC: basic approach to quality management, gurus of TQM, TQM Framework, benefits of TQM, ISO standards

Statistical Quality Control introduction, Quality Costs, Analysis of patterns of control charts, Chart for Variables, Charts for Attributes & Six Sigma.

JIT: Just in Time Introduction, enabling JIT to occur, Production smoothing, production planning, Shortening lead time and reducing the setup time in Toyota production system Kanban system, Andon.

TPM: concepts and types of maintenance engineering, the History and impact of Total Productive Maintenance, concept of OEE.