Syllabus for Entrance Test 2012-2013.

ME (Electronics)

- **NETWORKS**: •Network theorem, nodal & mesh analysis.

- **CONTROL SYSTEM**: Transfer Functions, Block Diagram Techniques, Signal Flow Graph ,Basic Control Components, Transient & Steady state responsanalysis.

- **ANALOG CIRCUITS**: •Biasing of transistors, single stage amplifiers, frequency response, feedback amplifiers, differential amplifiers, operational amplifiers & their applications, power amplifiers, oscillators, relaxation oscillators, rectifiers & regulated power supplies.

- **DIGITAL CIRCUIT**: •Switching circuit & Boolean algebra, Minimization of Boolean function, logic gates, combinational circuits: arithmetic circuits code converters multiplexes & decoders, semiconductor memories, microprocessors (8085): architecture programming, memory & I/O interfacing.

- **COMMUNICATION SYSTEM**: • Spectral analysis & signal transmission through linear time invariant systems, linear & angle modulation system & their performance analysis, sampling theorem, pulse code modulation, digital modulation system (ASK, FSK, PSK & DPSK) & their performance analysis, FDM & TDM.

- **ELECTROMAGNETICS**: •Maxwell's equation, wave equation, Poynting's vector, plane wave propagation, reflection of plane waves and dipole antenna.

ME Mechanical (Manufacturing), ME Mechanical (CAD/CAM) and ME (Thermal)

1. Manufacturing Processes – Casting, Moulding, Rolling, Forging etc.

2. Fluid Mechanics – Kinematics & Dynamics of Fluid Flow, Laminar and Turbulent Flow.

3. Thermodynamics – laws of thermodynamics, entropy, vapour power cycles, Steam condensers, steam turbines, steam nozzles.

4. Analysis of Mechanical Elements – Stress, Strain, Torsion, Stresses in beams, Deflection of beams, Columns.

5. Metallurgy – Metals & Alloy Systems, Phase diagrams, Heat treatment.

6. Machine tools – Metal cutting, Lathes, Various machine tools, CNC machines.

7. Theory of Machines – Velocity & Acceleration in mechanisms, Kinetics &Synthesis of mechanisms, Cams, Gears, Gyroscope, Vibrations.

8. Metrology & Quality Control – Tolerances, Surface Finish, Measuring, Magnification, measurement of angles, tapers and radius, straightness and Flatness, measurements of threads and gears. Instruments, Quality Control, Acceptance sampling, statistical quality control.

9. Manufacturing Engineering – theory of metal cutting, Jigs & Fixtures, Press Tools, Form Tools, automat, economic aspects of tooling.

10. CAD/CAM – Solid Models, Surface Models, C programming.

11. IC Engines – SI Engines, CI Engines, Fuel Systems, Performance Testing of Engines, Emission Control, alternative fuels, and engine emission control.

12. Computer Integrated Manufacturing – Manufacturing automation, flexible Manufacturing systems, group technology, Computer integrated manufacturing.

13. Robotics – Anatomy, common configurations, Technical specifications, sensors, programming and applications.

14. Industrial Engineering – production planning & control, inventory control, facility planning, productivity, material handling, method study, work study, Human factors in engineering.

ME (CIVIL Structures)

- **APPLIED MECHANICS**

Dimensions and units, Laws of forces Equilibrium, Mechanics, Moment of inertia Friction, Centre of gravity, Motion, Rotational Motion, Work, Power and Energy.

- **STRENGTH OF MATERIAL**

Stress and strain, Bending moment and Shear force, Stress Beams , Slope and Deflection, Strain energy, Compound Stresses and strains, Columns and Struts, Torsion, Thin Cylinders, Thick Cylinders, Rivets and Joints, Theorem of Three Moments.

- **STRUCTURAL ANALYSIS (THEORY OF STRUCTURES)**

Methods of analysis, Castigliano's theorems, Moment distribution method, strain energy method, slope deflection method, Equation of three moments, Analysis of trusses, Statically indeterminacy, Hinged arches, Influence lines, Plastic analysis.

- **DESIGN OF R.C.C. AND MASONRY STRUCTURES**

Concrete and its type, Methods of R.C.C. design, Balanced , Over and under reinforced sections, Single reinforced beams, Doubly reinforced beams , T•sections, Slabs, Columns, Shear reinforcement, Prestressed concrete, Footings, Retaining walls, Water Tanks, R.C.C. bridges.

ME(Environmental Engg.)

- **Water requirements:** quality and standards, basic unit processes and operations for water treatment ,distribution of water.
- **Sewage and sewerage treatment:** Quantity and characteristic of waste water sewerage; primary

and secondary treatment of waste water ; sludge disposal; effluent discharge standards, solid and Hazardous waste management, Pollutants in Environment, Environmental Impact Assessment.

- **Ecology:** Ecosystem concepts, Food Chain and Food Web. Energy Flow in Ecosystem,Population growth forms, Carrying Capacity, quantitative Ecology, Concept of Ecosystem.

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M.G.M's
Jawaharlal Nehru Engineering College
Department of Computer Science & Engineering
ME (CSE) Entrance Examination Syllabus

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Chapter 1:- Microprocessors and Interfacing
Machine instructions and addressing modes, ALU and data path, CPU control design, Memory interface, I/O interface, Instruction pipelining and 8086, Programming the 8085,Cache and main memory, Secondary storage , latest Microprocessors

Chapter 2:- Programming & Data Structures
Programming in C; Functions, Recursion, Parameter passing, Scope, Binding, Structure, Union, Pointers; Abstract data types, Arrays, Stacks, Queues, Linked lists, Trees, Binary Search Trees,.

Chapter 3:-Algorithms
Analysis, Asymptotic notation, Notation of space and time complexity, Worst and average case analysis; Design : Greedy approach, Dynamic programming, Divide-and-conqure;Tree and graph traversals, Connected components, Spanning trees, Shortest paths, Hashing, Sorting, Searching. Asymptotic analysis (best, worst, average cases) of time and space, upper and lower bounds, Basic concepts of complexity classes –P, NP, NP-hard, NP-complete.

Chapter 4:- Discrete Mathematics and Theory of Computation
Set Theory, Probability, Relations and Functions, Regular languages and finite automata, Context free languages and Push-down automata, Recursively enumerable sets and Turing machines, Undecidability .

Chapter 5:-Compiler Design
Lexical analysis, Parsing, Syntax directed translation, Runtime environments, Intermediate and target code generation, Basics of code optimization.

Chapter 6:-Operating System
Processes, Threads, Inter-process communication, Concurrency, Synchronization, Deadlock,CPU scheduling, Memory management and virtual memory, File Systems, I/O systems, Protection and security.

Chapter 7:-Databases
ER-model, Relational model (relational algebra, tuple calculus),Database design (integrity constraints, normal forms), Query languages(SQL), File structures (sequential files, indexing, B and B+ trees), Transactions and concurrency control.

Chapter 8:-Information Systems and Software Engineering

Information gathering, Requirement and feasibility analysis, Data flow diagrams, Process specifications, input/output design, Process life cycle, Planning and managing the project, Design, Coding, Testing, Implementation, Maintenance.

Chapter 9:-Computer Networks

ISO/OSI stack, LAN technologies(Ethernet, Token ring), Flow and error control techniques,Routing algorithms, Congestion control, TCP/UDP and sockets, IP(v4), Application layer protocols (icmp, dns, smtp, pop, ftp, http), Basic concepts of hubs, switches, gateways and routers. Network security-basic concepts of public key and private key cryptography, Digital signature, Firewalls.

Chapter 10:- Current Technologies

HTML, XML, basic concepts of client-server computing, open source.

M.E. Biotechnology Entrance examination syllabus.

Principles of Biochemical Engineering: Enzyme catalysis (Michalis Menton Kinetics) and reactor design. Material & energy balances of fermentation processes. Kinetics of microbial growth and product formation (Monad model- Leudekins-Piert model). Nature of fermentation processes. Transport phenomena in biochemical reactors- Mass transfer in immobilized enzyme systems and Oxygen transfer in submerged fermentation process, examples of primary metabolites, secondary metabolites and enzymes. Bioreactor operation and design, reactor sterilization. Batch, fed-batch and continuous culture process and cell recycle processes. Modeling of non-ideal behavior in bioreactors. Novel bioreactors, air-lift reactors, membrane bioreactors and fluidized bed reactors. Filtration and membrane based separations, centrifugation, extraction, absorption and chromatography.

(Fundamentals of Life Sciences and Informatics)

Life Sciences: Organization of unicellular organisms, invertebrates and vertebrates. Ultrastructure of plant and animal cells. Nucleic acids, protein synthesis, Mendalian genetics.Morphology of angiosperms. Biotechnology, Physiology.

Information Technology: Introduction to www.Networking: Basics-modem-hub-switch-commands to transfer filesremotelogin. Elements of languages used on the Internet JAVA- Perl. Elements of databases-Relational databases.

Life Sciences

Biochemistry: Cell structure and function; protein synthesis; genetic code; DNA & RNA; carbohydrate, protein and lipid metabolism, clinical biochemistry; In born erros of metabolism; hormones and their function.

Molecular biology & recombinant DNA technology: Properties of nucleic acids, chromosomes, DNA replication, damage and repair, gene manipulation, cloning vectors, gene libraries, screening of libraries, gene cloning, applications of recombinant DNA technology, PCR, RFLP, Western, Northern and Southern blotting.

Immunology : Cells of the immune system, lymphoid tissues, complement, antibodies, hybridoma technology, applications of monoclonal antibodies, antigen recognition, processing and presentation, cell mediated immunity, cytokines, hypersensitivity, vaccine technology, auto-immunity, transplantation, immune responses to various infections, Immunotechnology.

(Mathematics, Computer and Information Sciences)

Mathematics: Vectors- Trigonometry- Differentiation & Integration- Matrices

Information Sciences: Introduction to www. Networking: Basics-modem-hub-switch-commands to transfer files remote login. Elements of languages used on the Internet JAVA- Perl. Elements of databases-Relational database.

Computer Application: Basics of computers-hardware-components of a computer. Operating systems-windows Linux-simple commands. Elementary Boolean arithmetic- subtraction- addition- multiplication. Applications- word processing- spread sheets. Elementary basic programming commands and syntax.