



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
KUKATPALLY, HYDERABAD - 500 085, TELANGANA STATE, INDIA**

**ADMISSION NOTIFICATION
Ph.D / M.S RESEARCH PROGRAMS 2020-21**

Advt. No.: JNTUH/Ph.D,M.S./Admissions/2020

Dt.19.02.2020

Applications are invited from interested and eligible candidates for admissions into following Ph.D. programs in the faculties of **Engineering** and **Science & Technology**.

- 1. Part time Ph.D (Externally registered) Program**
- 2. Full time Ph.D (Regular) Program in Research Centres, Affiliated to JNTUH**
- 3. Part time Ph.D Program for Industrial Executives**

Eligibility criteria, application form, specializations and other information can be downloaded from JNTUH web site www.jntuh.ac.in. Filled in application form with photo copies of certificates and Registration fee should reach **The Directorate of Admissions** JNTUH, Kukatpally, Hyderabad -85 on or before **04.04.2020 by 4.00PM** without late fee.

Sd/- REGISTRAR

Last Date for Receipt of Applications

**04.04.2020 without late fee
15.04.2020 with late fee of Rs.1000/-**



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
KUKATPALLY, HYDERABAD - 500 085, TELANGANA STATE, INDIA**

**APPLICATION FORM
FULL TIME Ph.D. RESEARCH PROGRAMS ACADEMIC YEAR 2020-21
IN RESEARCH CENTRES AFFILIATED TO JNTUH**

Registration fee Rs.1000/- : Along with application form enclose a Demand Draft for Rs1000/- in favour of "The Registrar JNTUH" payable at Hyderabad. Fee once paid will not be refunded.

D.D.No.	Date	Bank	Amount
			Rs.1000/-

If the candidate is qualified in (please put [✓] mark in the appropriate box) (Enclose photo copy marks memo)	NET	SLET	JRF	CSIR	GATE	Others

Department (See the list)	
Name of the Specialization	

1. Name (In block letters): _____

2. Father's/Husband's Name: _____

3. Address: _____

Phone / Mobile No. : _____

Email ID : _____

Affix latest Passport size photograph

4.

Gender	
Male	Female

Date of Birth		
Date	Month	Year

Category							
OC	BC-A	BC-B	BC-C	BC-D	BC-E	SC	ST

(please put [✓] mark in appropriate box)

5. Qualifications: Starting from S.S.C. (Please enclose photo copies of Certificates)

Examination	Subject	College/School where studied	University / Board	Year of passing with Division	Aggregate Percentage

6. Details of employment for Full Time Research Program:

Particulars of employment(s) from date of completion of prescribed qualifying Examination till date.

Enclose photo copies of work experience / service certificates with full address of organization.

Name of Employer / Organization	Designation	Duration of Employment		Salary	Nature of work
		From	To		

7. Tentative Area of Research

(Please enclose a separate sheet of research proposal)

: _____

8. Research Facilities Required

(Please attach a separate sheet with list of facilities

Required for research proposal) : _____

9. Declaration by the Candidate:

I, Mr. / Mrs. _____ S/O D/O _____

shall abide by the Academic Regulations implemented time to time by the JNT University Hyderabad. I also declare that the particulars furnished in this application are correct and complete to the best of my knowledge. Any incorrect information is found my admission shall be cancelled at any point of time.

Address :

Mobile No:

Email ID :

Date :

SIGNATURE OF CANDIDATE



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
KUKATPALLY, HYDERABAD - 500 085, TELANGANA STATE, INDIA**

H A L L T I C K E T
FULL TIME Ph.D. RESEARCH PROGRAMS 2020-21
IN RESEARCH CENTRES AFFILIATED TO JNTUH

Original

Name of the Faculty	Name of the Department/Subject	(please put a [√] mark in the appropriate box)		
		Ph.D.	<input type="checkbox"/>	

Hall Ticket No.

Centre of Examination: **JNTUH College of Engg., Kukatpally Campus, Hyderabad – 85.**

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DATE OF EXAMINATION: _____ **TIME:** _____

(to be filled in by the Candidate)

Affix recent
passport size
Photograph duly
self attested

Name of the Candidate : _____

Father's /Husband's Name : _____

Identification Marks : (1) _____

(2) _____

Signature of Candidate

DIRECTOR OF ADMISSIONS



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
KUKATPALLY, HYDERABAD - 500 085, TELANGANA STATE, INDIA**

H A L L T I C K E T
FULL TIME Ph.D. RESEARCH PROGRAMS 2020-21
IN RESEARCH CENTRES AFFILIATED TO JNTUH

Duplicate

Name of the Faculty	Name of the Department/Subject	(please put a [√] mark in the appropriate box)		
		Ph.D.	<input type="checkbox"/>	

Hall Ticket No.

Centre of Examination: **JNTUH College of Engg., Kukatpally Campus, Hyderabad – 85.**

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DATE OF EXAMINATION: _____ **TIME:** _____

(to be filled in by the Candidate)

Affix recent
passport size
Photograph duly
self attested

Name of the Candidate : _____

Father's /Husband's Name : _____

Identification Marks : (1) _____

(2) _____

Signature of Candidate

DIRECTOR OF ADMISSIONS

INSTRUCTIONS TO THE CANDIDATE

1. Candidates will not be admitted into the Examination hall after the commencement of examination and not allowed to leave the Examination hall until the end of the examination.
2. The Hall Ticket shall be produced at the time of examination, failing which the candidate will not be allowed to appear for the examination.
3. **Use Blue or black Ball point pen only to darken the circles in the OMR Answer sheet.**
4. THE HALL TICKET SHALL BE PRESERVED TILL THE TIME OF ADMISSION - without which the candidate will not be permitted for interview.
5. No traveling expenses will be paid for journey undertaken for appearing for the Entrance Examination.
6. Adoption of any kind of unfair means at the time of examination or taking part in any act of impersonation will render the applicant liable for cancellation of his / her performance in the examination / answer script and forfeiture of his/her claim for appearing for the examination or admission. Decision of the Chief Superintendent of the Examination Centre shall be final in all these matters.
7. Issue of Hall Ticket and mere appearing for examination does not automatically entitle a candidate for admission.
8. Mathematical Tables, Calculators, Pagers, Mobile Phones and any other electronic gadgets are not allowed into the Examination Hall.

FULL TIME Ph.D. RESEARCH PROGRAM 2020-21**IN RESEARCH CENTRES UNDER JNTUH****INFORMATION TO CANDIDATES**

Admissions will be made to Full-Time (Regular research scholars) Ph.D. research programs offered by the J N T University Hyderabad in the following research centres in respective departments / subjects. Department wise vacancies available for the academic year 2020-21 are given below.

S.No.	Research Centre and Name of the College	Department	Specialization	Vacancies
1	Anurag Group of Institutions	C S E		2
		M B A		2
		Pharmacy		2
2	CVR College of Engineering	C S E		2
		E C E		2
3	CMR College of Engineering	C S E		2
4	Gokaraju Rangaraju Inst. of Engg. & Technology	M E C H		2
5	MLR Institute of Technology	C S E		2
		MECH		2
		ECE		2
6	Malla Reddy College of Engg. & Technology	E C E		2
7	Srinidhi Institute of Science & Technology	E C E		2
		M E C H		2
8	S R Engineering College	M E C H		2
9	Vidya Jyothi Institute of Technology	C S E		2
		M E C H		2
10	Vardhaman College of Engineering	C S E		2
		E C E		2
		M E C H		2
11	VNR Vignana Jyothi Institute of Engineering & Technology	C S E		2
		E C E		2
		CIVIL		2
		E E E		2
		M E C H		2
12	Inst. of Aeronautical Engg.	MECH		2
		ECE		2
		CSE		2
13	Vaagdevi College of Engg.	EEE		2
		CSE		2

Note: The University reserves the right to cancel or change the vacancies in any department or specializations based on availability of research supervisors / research facilities in the department.

The candidate has to submit separate application for each program.

ELIGIBILITY

For admission into Ph.D Program

Sl.No.	Faculty	Eligibility Criteria / Qualifications required
1	ENGINEERING	B.Tech. and M.Tech. in appropriate / relevant branch of Engineering.
2	SCIENCE & TECHNOLOGY	M.Sc. or M.Sc.(Tech.) in appropriate / relevant field of Science & Technology. For Pharmacy : B.Pharmacy and M.Pharmacy or Pharma.D.

Note: Candidates must have Post Graduate Degree in concerned discipline with a minimum of 55 % of marks in aggregate in the qualifying examination as per above eligibility. For SC / ST / BC candidates the aggregate shall be 50% as per UGC-2016 guidelines.

SUPERVISOR WILL BE ALLOTTED FROM RESPECTIVE RESEAR CENTRE

1. The Research Supervisor is from the college / department where the research centre is recognized, under JNTUH affiliated institutions. The list of colleges and the departments with research centres is given for the benefit of the candidates seeking full time Ph.D. admission in research centre in the academic year 2020-21.
2. If the proposed research area / interest by the candidate is not inline with the area of specialization being offered by the research centre then the candidate is required to work for his/her PhD in the existing specialization in research centre and the facility in the department, Otherwise the University will deny the admission to such candidates.
3. The University reserves the right to change or cancel the vacancies in the research centres based of supervisor availability or inadequate research facilities.

MODE OF SELECTION

Based on the performance in Entrance Examination conducted by JNTUH and Interview performance including the due weightage to percentage of marks obtained in undergraduate and postgraduate qualifying examinations.

ENTRANCE EXAMINATION

- An entrance examination is of 100 multiple choice questions.
- Duration of entrance examination is 2 hours.
- The minimum qualifying marks at the entrance examination is 50% for OC, 45% for BC and 40% for SC/ST category.
- The entrance examination syllabus, subject wise is available in JNTUH website.

- The list of eligible candidates for entrance examination with their Hall Ticket Numbers will be displayed in JNTUH website www.jntuh.ac.in. after completion of the last date of submission of applications.
- Candidates must collect their Hall Tickets, from the Office of **The Directorate of Admissions**, JNT University Hyderabad, Kukatpally, Hyderabad, two days before the date of entrance examination, between 10.00 am to 4.00 pm during working days. **The schedule of the entrance examination will be displayed in the JNTUH website www.jntuh.ac.in and there will be no separate intimation in this matter.**

INTERVIEW: Candidates are called for interview based on the fulfilling the following requirements.

- Candidates qualified in entrance examination conducted by JNT University Hyderabad. The list of qualified candidate will be displayed in JNTUH website.
- **The candidates who qualify the UGC-NET /UGC CSIR NET/ SLET / GATE / GPAT / Teacher Fellowship conducted by Govt., who passed M.Phil. program, and other tests as per UGC-2016 guidelines. These candidates are not required to take the written test conducted by the JNT University Hyderabad. However they should appear for the interview as per schedule, which will be displayed in the JNTUH website.**
- The interviews will be held at JNTUH, Kukatpally Hyderabad and Eligible candidates are required to attend the interview as per schedule at their own cost. The list of eligible candidates and date & time for interview will be displayed in JNTUH website www.jntuh.ac.in after entrance examination. No separate intimation will be made in this matter.

The University reserves the right to cancel the admission / registration of any candidate if found, at any stage, that the data furnished / certificates enclosed by the candidates are incorrect.

In case of any disputes concerning admissions to the courses of JNT University Hyderabad, the jurisdiction shall remain with the Courts or Consumer forum in Hyderabad only.

FEE AND OTHER CHARGES:

On selection for admission, candidates shall be required to pay the prescribed admission fee of **Rs. 1500/-** for Registration, academic fee of **Rs. 20,000/- per annum** and other admissible fee prescribed by the University. Thereafter the fee has to be paid every year @ Rs. 20,000/- per year till the successful completion of the program and submission of thesis or cancellation of the admission whichever the case may be. For more details of fee payment particulars, research methodology and evaluation procedure of thesis etc. can be known from the Director, R & D, JNT University Hyderabad.

GENERAL :

Application complete in all respects (in A4 size) accompanied with a Demand Draft for Rs. 1000/- drawn in favour of **“THE REGISTRAR, JNTUH”** payable at Hyderabad on any nationalized bank as Application Registration fee, is to be submitted to **“ office of The Directorate of Admissions, JNT University Hyderabad, Kukatpally, Hyderabad - 500 085”** either in person or by Registered post / Courier on or before **04.04.2020 by 4.00 pm without late fee. With late fee of Rs.1000/- upto 15.04.2020 by 4.00 pm.**

The University is not responsible for delay or loss of application in transit.

Incomplete applications and applications received after the last date will not be considered and fee paid will not be refunded.

**FULL TIME Ph.D. RESEARCH PROGRAM 2020-21
IN RESEARCH CENTRES UNDER JNTUH
SYLLABII FOR ENTRANCE TEST**

CIVIL ENGINEERING

Strength of Materials : Bending moment and shear force in statically determinate beam. Simple stress and strain relationship: Stress and strain in two dimensions, principal stresses, stress transformation, Mohr' s circle Simple bending theory, flexural and shear stresses, unsymmetrical bending, shear centre. Thin walled pressure vessels, uniform torsion, buckling of column, combined and direct bending stresses.

Structural Analysis: Analysis of statically determinate trusses, arches, beams, cables and frames, displacements in statically determinate structures and analysis of statically indeterminate structures by force / energy methods, analysis by displacement methods (slope deflection and moment distribution methods), influence lines for determinate and indeterminate structures. Basic concepts of matrix methods of structural analysis.

Concrete Structures: Concrete Technology- properties of concrete, basics of mix design – Special Concretes - 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 prestressed concrete, analysis of beam sections at transfer and service loads, IS Code provisions.

Steel Structures: Analysis and design of tension and compression members, beams and beam-columns, column bases. Connections- simple and eccentric, beam-column connections, plate girders and trusses Plastic analysis of beams and frames, IS Code provisions.

Soil Mechanics: Origin of soils, soil classification, three - phase system, fundamental definitions; relationship and interrelationships, permeability and seepage, effective stress principle, consolidation, compaction, shear strength.

Foundation Engineering: Sub-surface investigations- scope, drilling bore holes, sampling, penetration test plate load test. Earth pressure theories, effect of water table, layered soils. Stability of slopes- infinite slopes finite slopes. Foundation types-foundation design requirements. Shallow foundations- bearing capacity effect of shape, water table and other factors, stress distribution, settlement analysis in sands and clays. Deep foundations - pile types, dynamic and static formulae, load capacity of piles in sands and clays, negative skin friction.

Fluid Mechanics and Hydraulics: Properties of fluids, 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, flow measurements in channels, tanks and pipes. Dimensional analysis and hydraulic modeling. Kinematics of flow, velocity triangles and specific speed of pumps and turbines.

Hydrology: Hydrologic cycle, rainfall, evaporation, infiltration, stage discharge relationships, unit hydrographs, flood estimation, reservoir capacity, reservoir and channel routing. Well hydraulics.

Irrigation: Duty, delta, estimation of evapo-transpiration. Crop water requirements. Design of: lined and unlined canals, waterways, head works, gravity dams and spillways. Design of weirs on permeable foundation. Types of irrigation system, irrigation methods. Water logging and drainage, sodic soils.

ENVIRONMENTAL ENGINEERING

Water requirements: Quality standards, basic unit processes and operations for water treatment. Drinking water standards, water requirements, basic unit operations and unit processes for surface water treatment,

distribution of water. Sewage and sewerage treatment, quantity and characteristics of wastewater. Primary, secondary and tertiary treatment of wastewater, sludge disposal, effluent discharge standards. Domestic wastewater treatment, quantity of characteristics of domestic wastewater, primary and secondary treatment Unit operations and unit processes of domestic wastewater, sludge disposal.

Air Pollution: Types of pollutants, their sources and impacts, air pollution meteorology, air pollution control, air quality standards and limits.

Municipal Solid Wastes: Characteristics, generation, collection and transportation of solid wastes, engineered systems for solid waste management (reuse/recycle, energy recovery, treatment and disposal).

Noise Pollution: Impacts of noise, permissible limits of noise pollution, measurement of noise and control of noise pollution.

TRANSPORTATION ENGINEERING

Highway Planning: Geometric design of highways, testing and specifications of paving materials, design of flexible and rigid pavements.

Traffic Engineering: Traffic characteristics, theory of traffic flow, intersection design, traffic signs and signal design, highway capacity.

- END -

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ELECTRICAL AND ELECTRONICS ENGINEERING

Circuit Theory: Single phase RC, RL, and RLC circuits, resonance, Three phase circuits, Network topology, Network theorems, RC, RL, RLC transients, ABCD, Z and Y parameters, two port networks.

Electro mechanical energy conversion, performance analysis of all types of DC generators and DC motors. Single phase transformers, equivalent circuit efficiency regulation parallel operation.

Induction motor torque calculations slip torque characteristic, equivalent circuit, performance analysis and speed control.

Synchronous generator emf calculation armature reaction regulation calculation using emf, mmf and ZPF methods. Synchronizing torque, parallel operation and effect of change of excitation and mechanical power input. Steady state, transient and subtransient reactances. Synchronous motor torque calculation V and inverted V curves.

Control Systems: Time domain analysis, Routh stability criterion and Root locus technique and frequency domain analysis compensation techniques and state variable method.

Power Systems: Transmission line parameters, performance of short, medium and long lines surges, traveling wave phenomenon, corona, insulators and cables. Power flow studies, economic operation, load frequency control symmetrical and unsymmetrical fault analysis and power system stability. Principles of over current, differential, impedance mho relays and their application. Different types of circuit breakers. Arc quenching methods, restriking voltage rate of restriking voltage.

Power electronics: Converters and Inverters and Choppers. AC voltage regulators, control of DC motors using single phase and three phase converters and choppers. Control of induction motors with voltage source and current source inverters.

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MECHANICAL ENGINEERING

1. **Thermodynamics.** Laws. Properties of ideal and real gases and vapors, Power Cycles, Gas Power Cycle, Gas Turbine Cycles, Fuels and Combustion.
2. **I. C. Engine.** C.I and S.I. Engines, Detonation. Fuel injection and carburetion. Performance and Testing. Turbo prop. Engines, Rocket Engines. Elementary knowledge of Nuclear Power Plants and Nuclear Fuels.
3. Steam Boilers, Engines, Nozzles and Steam Turbines. Modern boilers. Steam Turbines, Types. Flow of steam thorough nozzles. Velocity diagrams for Impulse and Reaction Turbines. Efficiencies and Governing.
4. **Compressors, Gas Dynamics and Gas Turbines.** Reciprocating, centrifugal and axial flow compressors. Energy transfer equation. Velocity diagrams. Efficiency and Performance. Gas Turbine Cycle with multistage compression. Reheating and Regeneration.
5. **Heat Transfer, Refrigeration and Air Conditioning.** Conduction. Convection and Radiation. Heat Transfer, Heat Exchangers, Boiling and condensation. Refrigeration and heat pump cycles. Refrigeration systems. Coefficient of performance. Psychometric and psychometric chart. Comfort indices. Cooling and dehumidification methods. Industrial Air-conditioning Processes. Cooling and heating loads calculations.
6. **Fluid Mechanics and Machines.** Fluids-Properties, Pressure. Forces, Buoyancy and stability. Laminar and turbulent flow, equation of continuity. Energy and momentum equation. Bernoulli's Theorem. Dimensional analysis. Critical Reynolds number Layer concepts. Film lubrication. Incompressible flow through pipes, critical velocity. Friction loss due to sudden enlargement and contraction. Compressible flow through nozzles.
7. **Theory of Machines.** Velocity and acceleration of moving bodies; in machines. Inertia forces in machines. Cams; Gears and Geartrains, Flywheels and Governors. Balancing of Rotating and Reciprocating Masses. Free and Forced vibrations of systems. Critical speeds and whirling of shafts.
8. **Machine Design. Design of :** Joints-Threaded fasteners and Power Screws-Keys, Cotters, Couplings-Welded Joints. Transmission system :-Belt and chain drives-wire ropes-shafts. Gears-Sliding and Rolling bearings.
9. **Engineering Mechanics.** Forces and moments-Equilibrium and analysis of force systems-friction-centre of gravity, moment of Inertia-Kinetics.
10. **Strength of Materials.** Stress and strain in two dimension ; **Mohr's** circles ; Relations between Elastic Constants.
Beams- Bending Moments, Shear forces and deflection. **Shafts-** Combined bending, Direct and torsional stresses. **Thick-** Walled cylinders and spheres under Pressure, Spring, Struts and Columns. Theories of failure.
11. **Engineering Materials.** Alloys and Alloying Materials, Heat treatment ; Composition Properties and uses. Plastics and other newer engineering materials.
12. **Metallurgy.** Phase diagrams of Alloy systems, Iron carbon system, Solidification, Heat treatment Processes.
13. **Production Engineering.** Metals Machining :-Cutting tools ; Tool Materials, Wear and Machinability, Measurement of cutting forces.
Process :- Machining-Grinding, Boring, Gear Manufacturing, Metal forming, Metal Casting and Joining, Basic special purpose Programme and Numerically controlled machine Tools, Jigs and Fixtures (locating elements).
14. **Welding Procures.** Gas welding, Arc welding, resistance welding-welding equipment.
15. **Industrial Engineering.** Work study and work measurement. Wage incentive. Design of Production Systems and Product Cost. Principals of plant Layout. Production Planning and Control. Material Handling. Operations

- END -

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ELECTRONICS AND COMMUNICATION ENGINEERING

MICRO ELECTRONICS

Semi conductor physics, semiconductor Devices, single and multistage amplifiers, feedback amplifiers, oscillators, high frequency transistor circuits, and power amplifiers, linear and non-linear wave shaping circuits, differential amplifiers, operational amplifiers, linear and nonlinear applications of op-amp, PMOS, NMOS, CMOS, Bi-MOS technologies, VLSI technology, VLSI circuit design process, gate-level design using PLAs, FPGAs, CPLDs and PALs-design approach.

DIGITAL SYSTEM DESIGN

Logic families, Bipolar Logic & Interfacing, Digital ICs: Standard 74xx & CMOS 40xx series, Boolean Algebra, Combinational Circuits and their design, Design using VHDL, Sequential circuits and their design, Threshold Logic, 8085 & 8086 microprocessors-architecture, instruction set, addressing modes, 8051 microcontroller- architecture, modes of operation, interrupt structure, memory and I/O interfacing. Embedded systems-general purpose processors, state machine and concurrent process models, RTOS.

COMMUNICATIONS

Need for modulation, FDM, Analog modulation, AM and FM transmitters and receivers. Sampling, TDM, PCM, DM and ADM systems. Comparison of PSK, FSK, ASK and QPSK with reference to BW and Probability of error, matched filter, optimum filter, coherent and non-coherent reception, average information, Shannon's theorem, channel capacity, error detecting and error correcting codes, fundamentals of optical communication, types of fibers, attenuation, losses, dispersion, light sources and detectors. OSI and TCP/IP Models, network services, switching concepts, congestion, routing, error control, flow control and security. ISDN channels, services, ATM fundamentals, Multiple access techniques, co-channel interference, cell splitting Handoff mechanism, frequency response concept, basics of satellite communication, Spread Spectrum.

DIGITAL SIGNAL AND IMAGE PROCESSING

Linear Time invariant Systems, Analysis of signals and systems using Fourier transforms, z-transforms and Laplace transforms, DFT, FFT, multirate signal processing, power spectral estimation, and finite word length effects. Image processing fundamentals, enhancement in spatial and frequency domains. Lossless and Lossy compression methods, Image coding methods, compression standards, Edge detection using derivation operators, transformation, segmentation based on region growing methods.

ELECTRO MAGNETIC FIELDS, ANTENNAS AND MICROWAVES

Electrostatic and Magneto static fields, Maxwell's equations, EM wave characteristics, Guided waves, wave guides, Transmission lines, Antenna Fundamentals, Antenna Arrays, Low Frequency and High frequency antennas and Antenna Measurements wave propagation, Microwave tubes, solid state devices and components, microwave measurements.

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COMPUTER SCIENCE ENGINEERING

1. Programming and Data Structures:

Algorithm, flowchart, C Language, Control Statements, Functions, Structures, union and files, pointers in C, C programming covering all aspects. Simple and abstract data types and data structures stacks, queues, linked list, Trees balanced trees, Graphs, classes and objects, complexity of algorithms, divide and conquer, greedy, dynamic programming searching and traversal techniques, backtracking, Branch & Bound, NP Hard and NP complete problems.

2. Computer Organization and Architecture:

Processor basics, CPU organization, Data representation, Arithmetic representation, ALU's control design, Micro Programming, Nano programming. Memory Hierarchy, Cache and Virtual memory concepts. Parallel processing: PP in Uniprocessor, pipelining, SIMD and Vector processing, Multi programming, Data Flow computing. Introduction to VLSI computing.

3. Computer Networks:

Evolution of Data Communication and Networks, Transmission fundamentals, signals, media, encoding and modulation, switching techniques. OSI & TCP/IP models, functions and performance details of all layers. Network Security and communication security. Network programming, Sockets, TCP client server, Multiplexing and Socket options. UDP Sockets. IPC and Remote login.

4. Operating Systems and system Programming.

Process, CPU scheduling, Process synchronization, deadlocks, memory management, file system interface I/o systems assembles, Macros and MACRO Processors, Linkers. Distributed systems communication, synchronization, deadlocks, filesystems, shared memory Unix Utilities, Problem solving approaches in Unix, Unix Internals, Unix process, Threads and signals and Inter Process Communication.

5. Automata, compilers and OOPS:

Chomsky Hierarchy of languages, Grammers, machines and their designs. NP Hard and NP complete problems, Lexical, Syntax and Semantic analysis. Top down, Bottomup parsing. Intermediate code forms and code generation. Principles of Programming Languages, BNF notation, functional programming, LISP. Scope & Extent overloading, concurrency. Object oriented programming and features. C++ and Java programming.

6. Data Base Management Systems:

File systems, various data models, Relational algebra and calculus, Query optimization and evaluation, Database design, Concurrency control and recovery, Storing and Indexing Distributed data base design, Distributed Transaction Management, Reliability, Data Mining primitives, Languages and system Architectures, Mining association rules, classification and prediction, Cluster Analysis.

7. Software Engineering:

Generic View of Process, Process models, Software requirements, requirement engineering process, system models, Design Engineering, Object-oriented Design, performing user interface design, Testing Strategies, Plans for testing, preparing for the tests. Management of Software Engineering, Software Engineering Tools and Environments. Introduction to UML Concepts.

8. Computer Graphics and Image Processing.

Raster Scan Graphics, 2D & 3D Transformations, Viewing, Projection Variable surface detection, Shading, Animation. Digital Image processing fundamentals, Image enhancement techniques, Morphological Image processing, Image Segmentation, Knowledge representation. Reasoning Techniques, Gameplaying, Learning and Natural language Processing. HTML, Javascript/j script, Dynamic HTML, AJs, XML and Multimedia systems.

- END -

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PHARMACEUTICAL SCIENCES

- I. **Pharmaceutical Analysis:** Principles, instrumentation and applications of the following: Absorption Spectroscopy (UV, visible & IR). Fluorimetry, Flame Photometry, Potentiometry, Conductometry and Polarography. Pharmacopoeial assays. Principles of NMR, ESR, Mass Spectroscopy, and different chromatographic methods (TLC, Column, Paper, HPLC, HPTLC, GC). Concepts of qualitative and quantitative analysis, fundamentals of volumetric analysis concepts of GMP and GLP.
- II. **Pharmaceutical Chemistry:** Structure, nomenclature, classification, synthesis, SAR and metabolism of the following category of drugs & Stereochemistry of drug molecules. Hypnotics and Sedatives, Analgesics, NSAIDS, Neuroleptics, Antidepressants, Anxiolytics, Anticonvulsants, Antihistaminics, Local Anaesthetics, Cardio Vascular drugs – Antianginal agents Vasodilators, Adrenergic & Cholinergic drugs, Cardiotonic agents, Diuretics, Antihypertensive drugs, Hypoglycemic agents, Antilipidemic agents, Coagulants, Anticoagulants, Antiplatelet agent. Chemotherapeutic agents – Antibiotics, Antibacterials, Sulphadruugs. Antiprotozoal drugs, Antiviral, Antitubercular, Antimalarial, Anticancer, Anti-moebic drugs. Diagnostic agents. Preparation and storage and used of official Vitamins and Hormones.
- III. **Pharmacology:** General pharmacological principles including Toxicology. Drug interaction, Pharmacology of drugs acting on central nervous system, cardiovascular system, Autonomic nervous system, Gastro intestinal system and Respiratory system. Pharmacology of Autocoids, Hormones, Hormone antagonists, Chemotherapeutic agents including anticancer drugs. Bio assays, immuno Pharmacology. Drugs acting on the renal system. Drug – Drug interactions and Drug-Food interactions. Adverse drug reactions.
- IV. **Pharmacognosy:** Pharmacognosy of crude drugs that contain the following constituents. Alkaloids, Glycosides, Terpenoids, Steroids, Bioflavanoids, Purines, volatile oils, resins, seponines. Chemistry, tests, isolation, Characterization and estimation of phyto pharmaceuticals belonging to the above groups. Study of mineral drugs like bentonite, kaolin, talc and kieselguhr. Standardization of raw materials and herbal products. Quantitative microscopy including modern techniques used for evaluation of crude drugs. Biotechnological principles and techniques for plant development, Tissue culture. Fermentation technology and its applications in pharmacy. Evaluation of Crude drugs, Adulteration of Crude drugs and their detection by various methods.
- V. **Pharmaceutics:** Development, manufacturing standards Q.C. limits, labeling, as per the Pharmacopoeal requirements, Storage of different dosage forms like solid dosage forms, liquid dosage forms, semi-solid dosage forms and aerosols and of new drug delivery systems Biopharmaceutics and Pharmacokinetics and their importance in formulation.
- VI.

A details study of buffers and isotonic solutions, solubility of pharmaceuticals, interfacial phenomena, colloids, stability of colloids, rheology, thixotropy and its applications, micro meritics. A details study of the concept of chemical kinetics and their application in pharmacy. Advanced drug delivery systems.

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**FULL TIME Ph.D. RESEARCH PROGRAM 2020-21
IN RESEARCH CENTRES UNDER JNTUH
SYLLABII FOR ENTRANCE TEST**

MANAGEMENT SCIENCE (MBA)

Objective: To test the proficiency of students to do research in Business Management.

Note: The syllabus is framed on the lines of UGCNET examination.

Unit I: *Research aptitude*: Meaning, characteristics and types of research, steps of research, methods of research, research ethics, Characteristics and format of Thesis. Meaning and relevance of paper, research article, workshop, seminar, conference and symposium. Analysis and Interpretation of research data using statistical tools comprising parametric and non-parametric tests.

Unit II *Managerial Economics*: Demand Analysis, production function, cost output relations, market structures, pricing theories and methods.

Unit III *Business Environment*: Economic and legal Environment as applicable to Business in India, WTO, TRIPs and TRIMs, Fiscal and Monetary Policy of Government of India.

Unit IV: *Organizational Behaviour*: skills and roles in an organization, contemporary organization structures, understanding and managing individual behaviour, personality, perception, values and attitudes, learning, motivation, Understanding and managing group behaviour, interpersonal and group dynamics, Managing conflicts.

Unit V: *Human Resource Management*: Human resource planning, Recruitment, selection, Induction, training and development, performance management, compensation management. Basics of Industrial relations management.

Unit VI *Financial Management*: Valuation concepts, capital budgeting decisions, capital structure and cost of capital, dividend policy, long term and short term financing instruments, mergers and acquisitions.

Unit VII: *Marketing Management*: Demand measurement and forecasting, market segmentation, product mix, product life cycle, new product development, branding and packaging, pricing strategies, promotion mix, advertising and personal selling, channel management, CRM, marketing of services.

Unit VIII *Production Management*: Facility location, layout planning, PPC, Determinants of product mix, production scheduling, work measurement, Time and motion study, SQC, Linear programming, Transportation models, queuing theory, decision theory, PERT/CPM.

Unit IX: *Strategic Management*: Elements of Strategy, SWOT Analysis, strategy formulation and execution, core competence and competitive advantage, contemporary strategies for stability, growth, turnaround and expansion.

Unit X: *Management Information Systems*: Technology issues and data processing in organizations, MIS and Decision Making, System Analysis and Design, trends in Information technology, internet and internet based applications.

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