INFORMATION BROCHURE

**Ph.D Admissions
December 2020**

ACADEMIC YEAR 2020-21

SR UNIVERSITY

Ananthasagar, Hasanparthy Warangal – 506 371

1.0 Overview

The research at SR University (SRU) brings together academic and industrial talents from across a range of cutting-edge technologies. Our culture of innovation, strong industrial partnership, and international research collaborations with reputed universities will help you achieve your research ambitions. Our research focuses on the application-based areas that solve local, national, and global importance problems. The research is carried out under various centers with state-of-the-art laboratories equipped with advanced industrial graded computing facilities backed by the latest simulation software and guided by qualified and experienced academia from top national and international institutes.

2.0 Research Programs offered @SRU

SRU offers the following Ph.D programs for the academic year 2020-21 (Even Semester)

(i)   Ph.D in Engineering (Full-time / Part-time)

(ii)   Ph.D in Management (Full-time / Part-time)

Academic Year 2020-21 (Even Semester)	
School of Engineering	Ph.D in Computer Science and Engineering
	Ph.D in Electronics and Communication Engineering
	Ph.D in Electrical and Electronics Engineering
	Ph.D in Mechanical Engineering
	Ph.D in Civil Engineering
School of Business	Ph.D in Management

3.0 General Instructions:

Please read the following instructions carefully before filling the Application.

(i)   Merely filling an application form does not entitle a candidate for admission. Admission shall be based on the marks secured in the Online Entrance Test and Interview, subject to the fulfillment of the eligibility criteria.

(ii)   All admissions will be subject to verification of facts from the original certificates/ documents of the candidates. SRU reserves the right to cancel/revoke admission granted to a student for noncompliance/not meeting the admission criteria/ being found ineligible, even if the same is detected at a later date. The decision of the Admission Committee of the University regarding the eligibility of any applicant shall be final.

(iii)   No refund of application fee is allowed in any condition, whatsoever.

(iv) Candidate cannot claim the seat, merely because it is available. University Admission Committee shall decide the minimum cut offs for merit in various programs and the same shall be final.

The following Certificates (in original) are to be presented at the time of admission for verification:

i) UG Memorandum of Marks and Degree certificate
ii) PG Memorandum of Marks, Degree or Provisional Certificate as applicable.
iii) Transfer and Conduct certificates from the Institution where the candidate last studied.
iv) NET / GATE / SET / SLET etc. valid scores, if applicable.
v) Date of Birth (SSC / Matriculation or equivalent certificate).
vi) Service certificate and "No objection" certificate from the present employer (for part-time candidates only).

4.0 Eligibility Criteria for Admission

Candidates seeking admission into Ph.D. program can pursue research under Full-Time / Part-Time mode, subject to eligibility criteria as stipulated below:

4.1 Engineering Programs: Masters' degree (ME / M.Tech) with minimum of 55% marks or 6.25 CGPA in the appropriate discipline.

Admission is based on the merit rank in eligibility test and followed by an interview. The candidates who qualify in NET/SET/GATE are exempted from appearing in the eligibility test
4.2 Management Programs: Masters degree with minimum of 55% marks or 6.25 CGPA in the appropriate discipline.

Admission is based on the merit rank in eligibility test and followed by an interview. The candidates who qualify in NET/SET are exempted from appearing in the eligibility test

5.0 How to Apply

(a) Candidates have to submit online application form at https://sru.edu.in/sruadmissions by paying a non-refundable registration fee of Rs. 1000/- (Rupees One thousand only) through Debit card / Credit card (Master / VISA) / Net Banking / UPI.

(b) The University will not take any responsibility for the non-receipt of applications in time. Further, candidates have to check the eligibility before applying.

6.0 Details of Eligibility Test

Duration: The entrance test typically be one-hour duration and consists of 50 multiple choice question (No negative marking)

Syllabus: The syllabus for the eligibility test for admission into Ph.D program in engineering and management is given in **Annexure**

Shortlisted candidates will be called to appear for an interview before a doctoral admission committee of the respective schools. During the personal interview, the applicant will be assessed on his/her interest and motivation in doing research, conceptual clarity on chosen area of research and his past academic and research performances.

Important Dates and Schedules:

(a) Last date for the receipt of online applications – **30th November 2020**

(b) Schedule for online written test – **5th December 2020**

(c) Date of Interview – **10th December 2020**

7.0 Fee Structure

Program	Application Fee	Enrollment Fee (One Time)	Tuition Fee (Per Semester)
Ph.D (Full-time)	1,000	5,000	25,000
Ph.D (Part-time)	1,000	5,000	25,000

8.0 Minimum Duration of the Program

The minimum duration of the PhD program is normally as follows.

i) Engineering:
   3 Years for Full-Time Scholars
   4 Years for Part-Time Scholars

ii) Management:
   3 Years for Full-Time Scholars
   4 Years for Part-Time Scholars

9.0 Fellowships

Financial Support will be provided to full time Ph.D. scholars in the form of Ph.D. Assistantship, subject to terms and conditions as per University rules.

1. INR 18,000/- (Rupees Eighteen Thousand per month) to full time Ph.D. scholars in Engineering.

2. INR 15,000/- (Rupees Fifteen Thousand per month) to full time Ph.D. scholars in Management.

Note:
1. For NET/GATE qualified candidates, Additional Fellowship of INR 5000/- per month shall be considered.

2. Conditions for continuation and total duration of applicability of the Ph.D. Assistantship shall be as per the Ph.D. regulations of the University.

Annexure

Ph.D Eligibility Test Syllabus

Civil Engineering (CE)

Computer Science and Engineering (CSE)

Electronics and Communication Engineering (ECE)

Electrical and Electronics Engineering (EEE)

Mechanical Engineering (ME)

Management

Department of Civil Engineering

Syllabus for Ph.D Admission Eligibility Test

Section 1: Structural Engineering

Engineering Mechanics: System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Frictions and its applications; Centre of mass; Free Vibrations of undamped SDOF system.

Solid Mechanics: Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Simple bending theory, flexural and shear stresses, shear centre; Uniform torsion, Transformation of stress; buckling of column, combined and direct bending stresses.

Structural Analysis: Statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis.

Construction Materials and Management: Construction Materials: Structural Steel - Composition, material properties and behaviour; Concrete - Constituents, mix design, short-term and long-term properties. Construction Management: Types of construction projects; Project planning and network analysis - PERT and CPM; Cost estimation.

Concrete Structures: Working stress and Limit state design concepts; Design of beams, slabs, columns; Bond and development length; Prestressed concrete beams.

Steel Structures: Working stress and Limit state design concepts; Design of tension and compression members, beams and beam- columns, column bases; Connections - simple and eccentric, beam-column connections, plate girders and trusses; Concept of plastic analysis - beams and frames.

Section 2: Geotechnical Engineering

Soil Mechanics: Three-phase system and phase relationships, index properties; Unified and Indian standard soil classification system; Permeability - one dimensional flow, Seepage through soils – two - dimensional flow, flow nets, uplift pressure, piping, capillarity, seepage force; Principle of effective stress and quicksand condition; Compaction of soils; One-dimensional consolidation, time rate of consolidation; Shear Strength, Mohr's circle, effective and total shear strength parameters.

Foundation Engineering: Sub-surface investigations - Drilling bore holes, sampling, plate load test, standard penetration and cone penetration tests; Earth pressure theories - Rankine and Coulomb; Stability of slopes – Finite and infinite slopes, Bishop's method; Stress distribution in soils – Boussinesq's theory; Pressure bulbs, Shallow foundations – Terzaghi's and Meyerhoff's bearing capacity theories, effect of water table; Combined footing and raft foundation; Contact pressure; Settlement analysis in sands and clays; Deep foundations - dynamic and static formulae, negative skin friction.

Section 3: Water Resources Engineering

Fluid Mechanics: Properties of fluids, fluid statics; Continuity, momentum and energy equations and their applications; Potential flow, Laminar and turbulent flow; Flow in pipes, pipe networks; Concept of boundary layer and its growth; Concept of lift and drag.

Hydraulics: Forces on immersed bodies; Flow measurement in channels and pipes; Dimensional analysis and hydraulic similitude; specific energy, critical flow, hydraulic jump, uniform flow, gradually varied flow and water surface profiles.

Section 4: Environmental Engineering

Water and Wastewater Quality and Treatment: Basics of water quality standards – Physical, chemical and biological parameters; Water quality index; Unit processes and operations; Water requirement; Water distribution system; Drinking water treatment.

Sewerage system, quantity of domestic wastewater, primary and secondary treatment. Effluent discharge standards; Sludge disposal; Reuse of treated sewage for different applications.

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

Section 5: Transportation Engineering

Transportation Infrastructure: Geometric design of highways - cross-sectional elements, sight distances, horizontal and vertical alignments.

Geometric design of railway Track – Speed and Cant.

Concept of airport runway length, calculations and corrections; taxiway and exit taxiway design.

Highway Pavements: Highway materials - desirable properties and tests; Desirable properties of bituminous paving mixes; Design factors for flexible and rigid pavements; Design of flexible and rigid pavement using IRC codes.

Section 6: Geomatics Engineering

Principles of surveying; Errors and their adjustment; Maps - scale, coordinate system; Distance and angle measurement - Levelling and trigonometric levelling; Traversing and triangulation survey; Total station; Horizontal and vertical curves.

Photogrammetry and Remote Sensing - Basics of remote sensing and GIS.

Department of Computer Science and Engineering & AI
Syllabus for Ph.D Admission Eligibility Test

UNIT – I: Data Structures and Algorithms
Programming in C, Asymptotic Notations, stacks, queues, linked lists, trees, binary search trees, binary heaps, Graphs, Searching, Sorting and Hashing. Algorithm design techniques: divide-and-conquer, Greedy, Dynamic programming and Backtracking, NP-Hard and NP-Complete.

UNIT II: Computer Organizations and Operating Systems
Boolean algebra, Number representations and computer arithmetic, Instructions and addressing modes
Instruction pipelining Memory hierarchy. I/O interface (interrupt and DMA mode).
System calls, processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU and I/O scheduling. Memory management and virtual memory. File systems.

UNIT – III Data Warehousing and Mining
Databases and Database users, Database systems concepts and Architecture, Data modeling using the Entity-Relationship model, Introduction to Data Mining, Business Intelligence, Data Warehouse and OLAP Technology, Data Preprocessing, Extraction, Transformation and Loading, Data Mining Primitives, Regression, Associations, Classification and Prediction, Cluster Analysis.

UNIT – IV Networks and Security
The OSI model, layers in OSI model, TCP/IP suite, Physical Layer, Data link layer, Medium Access sub layer Network Layer, Transport Layer, Application Layer, Secret Key Cryptography, Hash Functions and Message Digests, Public key Cryptography and Authentication.

UNIT – V Artificial Intelligence and Cloud Computing
Problem Solving by Searching, Knowledge and Reasoning, Uncertain knowledge and Reasoning, Learning, Problem Solving by Searching, Cloud Computing Overview, Cloud Insights, Cloud Architecture- Layers and Models, Virtualization, Simulators of Cloud.

UNIT – VI Software Engineering
Process Models, Agile Process Model, Requirement Engineering, Design Engineering, Software Metrics and Testing, Object Oriented Design.

Department of Electronics and Communication Engineering
Syllabus for Ph.D Admission Eligibility Test

Section 1: Networks, Signals and Systems
Circuit analysis: Node and mesh analysis, superposition, Thevenin's theorem, Norton's theorem, reciprocity. Sinusoidal steady state analysis: phasors, complex power, maximum power transfer.

Linear 2-port network parameters, wye-delta transformation.

Continuous-time signals: Fourier series and Fourier transform, sampling theorem and applications.

Discrete-time signals: DTFT, DFT, z-transform, discrete-time processing of continuous-time signals. LTI systems: definition and properties, causality, stability, impulse response, convolution, poles and zeroes, frequency response, group delay, phase delay.

Section 2: Electronic Devices
Energy bands in intrinsic and extrinsic semiconductors, equilibrium carrier concentration, direct and indirect band-gap semiconductors.

Carrier transport: diffusion current, drift current, mobility and resistivity, generation and recombination of carriers. P-N junction, Zener diode, BJT, MOS capacitor, MOSFET, LED, photo diode and solar cell.

Section 3: Analog Circuits
Diode circuits: clipping, clamping and rectifiers.

BJT and MOSFET amplifiers: biasing, ac coupling, small signal analysis, frequency response.

Op-amp circuits: Amplifiers, summers, differentiators, integrators, active filters, Schmitt triggers and oscillators.

Section 4: Digital Circuits
Number representations: binary, integer and floating-point- numbers. Combinatorial circuits: Boolean algebra, minimization of functions using Boolean identities and Karnaugh map, logic gates and their static CMOS implementations, arithmetic circuits, code converters, multiplexers, decoders.

Sequential circuits: latches and flip-flops, counters, shift-registers, finite state machines, propagation delay, setup and hold time, critical path delay.

Data converters: sample and hold circuits, ADCs and DACs Semiconductor memories: ROM, SRAM, DRAM.

Computer organization: Machine instructions and addressing modes, ALU, data-path and control unit, instruction pipelining.

Section 5: Communications

Random processes: autocorrelation and power spectral density, properties of white noise, filtering of random signals through LTI systems.

Analog communications: amplitude modulation and demodulation, angle modulation and demodulation, spectra of AM and FM, super hetero dyne receivers.

Information theory: entropy, mutual information and channel capacity theorem.

Digital communications: PCM, DPCM, digital modulation schemes (ASK, PSK, FSK, QAM), bandwidth, inter-symbol interference, MAP, ML detection, matched filter receiver, SNR and BER.

Fundamentals of error correction, Hamming codes, CRC.

Section 6: Electromagnetics

Maxwell's equations: differential and integral forms and their interpretation, boundary conditions, wave equation, Poynting vector.

Plane waves and properties: reflection and refraction, polarization, phase and group velocity, propagation through various media, skin depth.

Transmission lines: equations, characteristic impedance, impedance matching, impedance transformation, S- parameters, Smith chart.

Rectangular and circular waveguides, light propagation in optical fibers, dipole and monopole antennas, linear antenna arrays.

Department of Electrical and Electronics Engineering

Syllabus for Ph.D Admission Eligibility Test

Section 1: Electric Circuits

Network elements: ideal voltage and current sources, dependent sources, R, L, C, M elements; Network solution methods: KCL, KVL, Node and Mesh analysis; Network Theorems: Thevenin's, Norton's, Superposition and Maximum Power Transfer theorem; Transient response of dc and ac networks, sinusoidal steady-state analysis, resonance, two port networks, balanced three phase circuits, star-delta transformation, complex power and power factor in ac circuits.

Section 2: Electrical Machines

Single phase transformer: equivalent circuit, phasor diagram, open circuit and short circuit tests, regulation and efficiency; Three-phase transformers: connections, vector groups, parallel operation; Auto-transformer, Electromechanical energy conversion principles; DC machines: separately excited, series and shunt, motoring and generating mode of operation and their characteristics, speed control of dc motors; Three-phase induction machines: principle of operation, types, performance, torque-speed characteristics, no-load and blocked-rotor tests, equivalent circuit, starting and speed control; Operating principle of single-phase induction motors; Synchronous machines: cylindrical and salient pole machines, performance and characteristics, regulation and parallel operation of generators, starting of synchronous motors; Types of losses and efficiency calculations of electric machines

Section 3: Power Systems

Basic concepts of electrical power generation, ac and dc transmission concepts, Models and performance of transmission lines and cables, Series and shunt compensation, Electric field distribution and insulators, Distribution systems, Per unit quantities, Bus admittance matrix, Gauss- Seidel and Newton-Raphson load flow methods, Voltage and Frequency control, Power factor correction, Symmetrical components, Symmetrical and unsymmetrical fault analysis, Principles of over-current, differential, directional and distance protection; Circuit breakers, System stability concepts, Equal area criterion, Economic Load Dispatch (with and without considering transmission losses).

Section 4: Control Systems

Mathematical modeling and representation of systems, Feedback principle, transfer function, Block diagrams and Signal flow graphs, Transient and Steady-state analysis of linear time invariant systems, Stability analysis using Routh-Hurwitz and Nyquist criteria, Bode plots, Root loci, Lag, Lead and Lead-Lag compensators; P, PI and PID controllers; State space model, Solution of state equations of LTI systems, R.M.S. value, average value calculation for any general periodic waveform.

Section 5: Power Electronics

Static V-I characteristics and firing/gating circuits for Thyristor, MOSFET, IGBT; DC to DC conversion: Buck, Boost and Buck-Boost Converters; Single and three-phase configuration of uncontrolled rectifiers; Voltage and Current commutated Thyristor based converters; Bidirectional ac to dc voltage source converters; Magnitude and Phase of line current harmonics for uncontrolled and thyristor based converters; Power factor and Distortion Factor of ac to dc converters; Single-phase and three-phase voltage and current source inverters, sinusoidal pulse width modulation.

Department of Mechanical Engineering

Syllabus for Ph.D Admission Eligibility Test

Section 1: Mechanics and Design

Engineering Mechanics: Free body diagrams and equilibrium, Trusses and frames.

Strength of materials (SOM): Principal Stress and Strain, Stress and Strain, Bending Moment and Shear Force Diagram, Torsion, Riveted and Welded Joint, Spring, Theories of Column (Euler method, end conditions), Strain Energy Method (Castigliano's theory), Theories of failure.

Theory of Mechanism (TOM): Mechanism, Linear Vibration Analysis of Mechanical Systems, Gear train, Flywheel (Coefficient of Fluctuation of speed, Coefficient of Fluctuation of energy)

Design: Rolling Contact Bearings, Load-life Relationship, Sliding contact bearing, Modes of Lubrication, Sommerfeld Number, Fluctuating Load Consideration for Design, Clutch, Brake.

Section 2: Materials, Manufacturing, and Industrial Engineering

Engineering Materials: Iron-carbon Equilibrium diagram, TTT diagram, Heat treatment, Crystal structure & crystal defects.

Manufacturing Science: Theory of metal cutting, forces, tool life, Rolling calculations, Wire drawing and Extrusion calculations, Sheet metal operations, clearance, force, power, shear calculations, Lathe, drilling, milling, shaping cutting time calculations, Grinding and finishing, ECM MRR, feed calculations, EDM theory, comparison of all NTMM, Limit, tolerance, fit, Jig & Fixture, 3-2-1 principle, Welding: V-I Characteristics calculations, Resistance welding calculations, Casting: allowances, Riser Design, Sprue Design, Pouring time calculations, Special, Castings.

Industrial Engineering: EOQ Models, PERT & CPM, Forecasting, Assembly line balancing.

Section 3: Fluid Mechanics and Thermal Sciences:

Fluid Mechanics: Properties of fluid, Pressure measurement, manometers, Fluid kinematics, Bernoulli's Equation, Venturimeter, Boundary Layer, Thermal Boundary Layer, Compressible Flow, Hydraulic Turbine, Centrifugal Pump.

Thermodynamics: Basic Concepts, Application of First law, Entropy, Availability, Pure Substance, Gases and Gas mixture, Thermodynamics relations.

Heat Transfer: Conduction, Critical Thickness of Insulation, Unsteady Conduction (Lumped Parameter Analysis), Heat Exchangers (LMTD, NTU), Radiation (The Stefan-Boltzmann Law, Shape Factor Algebra, Heat Exchange between Nonblack Bodies).

Refrigeration and Air Conditioning (RAC): Heat engine, heat pump, refrigerator, Vapour Compression Systems, Psychrometry.

Power plant: Steam Cycle, Gas Cycle, Compressor.

School of Business

Syllabus for Ph.D Admission Eligibility Test in Management

Section 1: Human Resource Management

Importance and Functions, Scope of HRM; Manpower Planning: Manpower planning process, Job Description, specification and analysis. Job design, Recruitment, Employee Induction, Training and Development, Performance Appraisal; Compensation & Benefits, Compliances, Labour Laws, Employee Engagement, Grievance Redressal, HR MIS, Automation in HR, Organisational Culture, Change Management, Changing nature of Workplaces.

Section 2: Organisational Behaviour

Nature scope & significance of OB, Foundations of Individual Behavior, Personality & OB, Perceptual process, Importance of Perception in OB, Herzberg's Two Factor theory, Maslow's Need Hierarchy theory, Alderfer's ERG theory, Types &Barriers to communication, Communication improving Interpersonal Effectiveness, Nature & types of Groups, Why people join groups, Group Cohesiveness & Group Decision Making-managerial Implications, Effective Team Building, Leadership & management, Theories of leadership, Trait theory, Behavioural Theory, Contingency Theory, Leadership & Followership, How to be an Effective Leader, Nature of Conflict & Conflict Resolution, Planned Change & OB Techniques, Individual & Interpersonal Behaviour, Theories of learning, Principles of learning; Attitudes – Source of attitudes, Types of Attitudes, Organizational Culture and Change Management.

Section 3: Marketing Management

Needs & Wants, Marketing Orientations & Environment, Buyer Behaviour, Marketing Planning Process, Consumer satisfaction and delight, Identification and Analysis of Competitors, Market Segmentation, Targeting and Positioning strategies, Marketing Mix, New Product Development, Product Life Cycle, Product Mix decisions, Branding, Packaging and Labeling, Pricing Decisions, Factors influencing Price – five "C"s; Pricing Strategies, Distribution Channels, Advertising, Direct Selling, Sales Promotion, Integrated Marketing Communication; Marketing Control techniques; Social Marketing; Green Marketing; Web Marketing.

Section 4: Financial Management

Nature and Scope of Financial Management- Goals & objectives of financial management, Interface of Finance with other business functions, Factors affecting Financial Planning, Sources of long term and short term financing, Overview of Indian Stock Markets; Capital Budgeting decisions: NPV- IRR - Risk analysis in capital budgeting. RADR, certainty equivalent, decision tree analysis; Theories of Capital structure -EBIT &EPS analysis – financial Leverage-Operating leverage - Cost of capital and WACC; Dividend decisions: dividend models - dividend theories - Working capital - cash Management - Inventory Management – Receivables management.

Section 5: Operations Management

Production Management Types of production processes and their suitability; Just-in-time production; manufacturing operations versus service operations; Steps/levels in production planning and control; Project Management,, Inventory Control, Enterprise Resource Planning Quantitative Techniques & Methods, – Gantt Chart, Master production schedule, PERT/CPM Strategic planning, aggregate planning, shop-floor planning; Planning devices Location modeling; Factors influencing layout decision; Facility layout modeling; types of material handling equipment and their purposes, Job design, Work study, Six sigma; TQM, Managerial Economics

Section 6: Strategic Management

Definition, Nature, , Dimensions and purpose of Strategic Management Strategic Management – Process, Vision, Mission and Business Definition Models of Strategic Management: Mintzberg, Ansoff, Porter, Prahalad and Gary Hammel, McKinsey's Strategic Management in Global Environment: Need for Globalization, Different Types of International Companies, Development of a Global Corporation, Complexity of Global Environment, International Culture, Implementing Global Strategies, Competitive Analysis: Competitor Analysis Framework, Rivalry Analysis, Competitive Dynamics, Competitive Rivalry Industry Analysis: Formulation of Strategy, Five Competitive Forces that Shape Strategy, PESTLE Analysis, Competition and Value, Industry Structure, Technology Lifecycle, Industry Analysis in Practice, Defining the Relevant Industry Strategic Management Process: Purposes of Strategic Management Process, Steps involved in the Strategic Management Process, Strategic Management Process, Strategy Formulation, Constraints and Strategic Choice, Strategy Implementation, Strategic Control and Assessment

Section 7: Entrepreneurship

Nature of Entrepreneurship, Start-up Ecosystem in India & Globally, Business opportunity Identification & Selection, Entrepreneurial Motivation & Managerial Competencies, Validation 7 Business models, Scaling of Ventures, Funding types and process, Technology Commercialisation, Intellectual, Property, Role of Govt in Entrepreneurship, Geographic & Demographic Trends in Entrepreneurship, Entrepreneurial Frameworks, Market Research & Testing, Revenue Models, Technology Management in Innovation.

Section 8: Education Innovation

Curriculum & Instructional Design, Theories & Frameworks for Learning, Technologies that support learning, Assessments- types & Need, Blended Learning, Learning Management Systems, Personalised Learning, Open School systems, MOOCs, Project Based Learning, Skills for Innovation Based economy, Teaching for Interdisciplinary Environments