Shri Vishwakarma Skill University

(A State University established under Haryana Act No. 25 of 2016)

www.svsu.ac.in

Ph.D. Information Brochure

(2024-25)

IMPORTANT DATES

Sr. No.	Activity	Purposed Timeline
1.	Submission of online application commences on (Link - Qfix - Online Form (eduqfix.com))	06-06-2024
2.	Last date for submission of online application and application fee	30-06-2024
3.	Range of dates for Test / Interview	15-07-2024 to 25-07-2024
4.	Date of Orientation and Registration for new students	08-08-2024 to 15-08-2024
5.	Commencement of classes	16-08-2024

Candidates are required to make the payment of Rs. 1000/- (Rs. 500/- for Female and SC/ ST and EWS Category) via the online payment gateway for the application form through Debit/Credit Card, Net Banking. The application without application fee will not be entertained for further process. Fee once paid will not be refunded.

Category for Admission

ROHC: Rest of Haryana Domicile Candidates (Part of All India Category)

HOGC: Haryana Domicile Open General Category

SC: Schedule Cast Category of Haryana Domicile

BCA: Backward Class A Category of Haryana Domicile

BCB: Backward Class B Category of Haryana Domicile

PH: Physically Handicapped Category of Haryana Domicile

HOGC-EWS: Haryana Open General Category- Economically weaker section Category of Haryana Domicile

ABOUT THE UNIVERSITY

In tune with the vision of a Skill India, Government of Haryana has established Shri Vishwakarma Skill University (SVSU), first of its kind in India, in 2016 in village Dudhola in District Palwal, Haryana. The University is built on 82.7 acres of land with a state-of-the-art infrastructure, aiming at a capacity to train 12,000 students per year, as part of its future Master Plan. The University is aimed at providing facilities and promote trainings, studies and research in emerging areas of skill, including new frontiers of manufacturing, design, logistics and transportation, automation, maintenance, information technology, healthcare, construction, banking and finance, marketing, hospitality etc. and also to achieve excellence in enhancement in these and connected fields.

The university is offering certificate, diploma, degree level programmes in the said areas. All the programmes are mapped with National Skills Qualifications Framework (NSQF) with a provision of multiple entry and exit and facilitating upward mobility of the students from Certification to Doctoral level. All the programmes offered by the University have been designed and developed with an Industry Integrated Dual Education Model (IIDEM) that facilitates "Earn-While-Learn" and provides students with an opportunity to enhance their qualifications through On-the-Job Training (OJT) in the Industry.

This university has following constituent academic units:

- **Skill Faculty of Engineering & Technology**
- **Skill Faculty of Management Studies and Research**
- **Skill Faculty of Applied Sciences and Humanities**
- **Skill Faculty of Agriculture**

All skill faculties are offering Ph.D. programs in areas of automation, robotics, green technology, manufacturing, banking and finance, policy planning, marketing, etc. with an objective to get research outcome to create the socio-economic impact created on society/Industry through the research work carried out by the candidate.

Message from the Hon'ble Vice Chancellor

Dear Prospective Scholars,

It gives me immense pleasure to welcome you to Shri Vishwakarma Skill University, where innovation meets academia and industry seamlessly. As the Vice Chancellor, I am delighted to announce our pioneering Ph.D. program, offering a unique blend of academic rigor and real-world application through Industry-Integrated Problems.

At Shri Vishwakarma Skill University, we believe in nurturing talent that not only excels in academic pursuits but also thrives in addressing the challenges faced by industries today. Our Ph.D. program is designed to provide you with the opportunity to delve deep into research while working on real-world problems alongside industry experts.

One of our key initiatives, "Vikisit Bharat," embodies our dedication to advancing research that directly impacts the socio-economic landscape of India. Under this initiative, our scholars engage in research projects focused on sustainable development, technology innovation, and community empowerment. By collaborating with local communities, government bodies, and industry partners, we strive to drive positive change and create solutions that resonate at both local and national levels.

As a scholar in our Ph.D. program, you will have access to cutting-edge resources, mentorship from esteemed faculty members, and a collaborative environment that fosters innovation and creativity. Whether your passion lies in science, engineering, technology, management, or any other field, our program offers a platform for you to make a tangible impact on both academia and industry.

Join us at Shri Vishwakarma Skill University and embark on a journey of discovery, innovation, and transformation. Together, let's shape the future and redefine the boundaries of knowledge.

All my best wishes,

Dr. Raj Nehru,

Vice Chancellor,

Shri Vishwakarma Skill University, Haryana

Message from the W/Registrar, SVSU

Dear Prospective Ph.D. Scholars,

It is with great pleasure and enthusiasm that I welcome you to Shri Vishwakarma Skill University's esteemed Ph.D. program. As the Registrar of this esteemed institution, I am proud to witness the dedication and passion our faculty and students bring to their research endeavours.

Our Ph.D. program stands as a beacon of academic excellence, fostering an environment where innovation thrives and boundaries are constantly pushed. Here, you will embark on a transformative journey, delving into cutting-edge research that contributes to the advancement of knowledge in your respective fields.

At Shri Vishwakarma Skill University, we believe in nurturing the next generation of thought leaders and change-makers. Our faculty members are leaders in their fields, providing mentorship and guidance as you navigate the complexities of your research. Additionally, our state-of-the-art facilities and resources offer unparalleled support for your academic pursuits.

Whether your interests lie in the sciences, humanities, engineering, or any other discipline, our Ph.D. program provides the platform for you to explore, question, and innovate. Join us as we embark on a journey of intellectual discovery and academic excellence.

I extend my warmest wishes to all prospective Ph.D. scholars. Your journey starts here, at Shri Vishwakarma Skill University.

Warm regards,

Prof Jyoti Rana

Registrar,

Shri Vishwakarma Skill University, Haryana

Message from Dean Academic Affairs, SVSU

Dear Prospective Ph.D. Candidates,

It gives me immense pleasure to introduce you to the Shri Vishwakarma Skill University (SVSU). SVSU is India's first Government Skill University, established by the Government of Haryana in 2016 which is located in the village Dudhola of Palwal District of Haryana. SVSU is working to provide skill education by equipping students with industry-relevant skills through its various programmes.

The university is keen to foster advanced research and innovation across all major disciplines and provide an environment that nurtures academic excellence and industry-relevant skills amongst the research scholars.

The Ph.D. program at SVSU stands out for its unique emphasis on application-based research and industry mentorship. Our mission is to bridge the gap between academic knowledge and practical industry needs, ensuring our research contributes directly to societal and industrial advancements. As part of our commitment to this mission, all Ph.D. students are required to engage in industry internships, gaining invaluable first-hand experience and insights into the challenges and opportunities within their field of study. Our distinguished faculty, state-of-the-art facilities, and extensive industry partnerships form the backbone of our Ph.D. program. At Shri Vishwakarma Skill University research is supported by a robust framework of academic excellence and industry engagement.

Prof. R S Rathore

Dean Academic Affairs
Shri Vishwakarma Skill University, Haryana

Message from the Dean of Research and Development

Dear Prospective Ph.D. Candidates,

I am thrilled to welcome you to the Ph.D. admission brochure of Shri Vishwakarma Skill University. Our university is at the forefront of integrating academic rigor with real-world industry challenges, and our Ph.D. program epitomizes this mission.

At SVSU, we are committed to nurturing research that addresses critical problems faced by the industry. Our Ph.D. program is uniquely designed to be industry problem-oriented, ensuring that our research not only advances academic knowledge but also provides tangible solutions to pressing issues in the manufacturing sector.

Our vision extends beyond national boundaries, aiming to deliver technical solutions and facilitate technology transfer for manufacturing industries both in India and abroad. We believe in the power of collaboration and innovation, and we strive to create a research ecosystem that bridges the gap between academia and industry.

By choosing SVSU for your doctoral studies, you will be embarking on a journey that offers the opportunity to work on ground-breaking projects, collaborate with industry leaders, and contribute to the technological advancements that shape the future of manufacturing. Our state-of-the-art facilities, distinguished faculty, and strong industry partnerships provide an ideal environment for impactful research.

We invite you to join us in this exciting venture and become a part of a community dedicated to excellence and innovation. Together, we can drive the technological progress that will define the next generation of manufacturing.

Prof. Kulwant Singh

Dean R&D,
Shri Vishwakarma Skill University, Haryana

IMPORTANT INFORMATION FOR CANDIDATES

1. This information brochure is for full time/part time Ph.D. for 2024-25 session. The Application Form for admission would be available online on University website: www.svsu.ac.in
2. The duly completed application form along with all required enclosures should be submitted through online mode by the last date as specified. Candidates are not required to send hard copy of application form and fee. No application will be entertained thereafter.
3. A candidate who furnishes particulars which are found to be false or suppresses material information, will not be considered for admission and if he/ she is admitted on such information, his/ her admission shall be cancelled as per University rules and all fees deposited by him/ her will stand forfeited.
4. The candidate is required to download the admit card from the website and follow the instructions given therein. The admit card will not be sent by post separately.
5. All the admitted candidates will be governed by the Academic Ordinances and/ or Ph.D. regulations as laid down by the University.
6. The candidates are advised to read the instructions carefully before filling the online application form. Incomplete application forms shall summarily be rejected.
7. Changes in Subject/Department or category etc., once opted for the purpose of admission, will not be allowed.
8. All the updated latest information/notices/changes/modifications will be displayed on the website of the university. The candidates are required to visit the website regularly for the latest information.
9. The merit list will be displayed on the website of the university (as per admission schedule). Individual allotment letters will not be sent to the candidates by the university. Reporting to the allotted Skill Faculty is mandatory for each candidate physically if her/his name is mentioned in the merit list
10. Candidates may raise objections/complaints if any, about discrepancies in the question booklet/answer key within 24 hours of uploading the same on the university website. The complaint be sent by the candidate to the Controller of Examinations at mail: coe@svsu.ac.in . Thereafter, no complaint, in any case will be considered.

11. The mentioned dates are tentative and changes if any shall be notified on the website.
12. The candidate already employed should submit the No Objection Certificate from her/his employer in the prescribed format (Annexure A) at the time of interview wherever applicable.
13. The minimum eligibility criteria mentioned for Ph.D programme is only an enabling clause. The Deptt./Centre/School may fix higher criteria at the time of shortlisting keeping in view the number of candidates, minimum background expected to cope with the programme etc.
14. In the case of any inconsistencies in the rules or any clarification thereof, the matter shall be referred to the competent authority for interpretation whose decision shall be final.

ELIGIBILITY

Eligibility Criteria for Admission to the Ph.D. Programme:

1. Candidates who have completed 1-year/2-semester master's degree programme after a 4- year/8-semester bachelor's degree programme or a 2-year/4-semester master's degree programme after a 3-year bachelor's degree programme or qualifications declared equivalent to the master's degree by the corresponding statutory regulatory body, with at least 55% marks in aggregate or its equivalent grade in a point scale wherever grading system is followed or equivalent qualification from a foreign educational institution accredited by an assessment and accreditation agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country to assess, accredit or assure quality and standards of the educational institution.
2. A relaxation of 5% marks or its equivalent grade may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently-Abled, Economically Weaker Section (EWS) and other categories of candidates as per the decision of the Commission from time to time.
3. Provided that a candidate seeking admission after a 4-year/8-semester bachelor's degree programme should have a minimum of 75% marks in aggregate or its equivalent grade on a point scale wherever the grading system is followed. A

relaxation of 5% marks or its equivalent grade may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently-Abled, Economically Weaker Section (EWS) and other categories of candidates as per the decision of the Commission from time to time.

4. Candidates who have completed the M.Phil. programme with at least 55% marks in aggregate or its equivalent grade in a point scale wherever grading system is followed or equivalent qualification from a foreign educational institution accredited by an assessment and accreditation agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country to assess, accredit or assure quality and standards of educational institutions, shall be eligible for admission to the Ph.D. programme. A relaxation of 5% marks or its equivalent grade may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently-Abled, Economically Weaker Section (EWS) and other categories of candidates as per the decision of the Commission from time to time.

Ph.D. SEATS FOR SESSION 2024-2025

Sr. No.	Name of Skill faculty	Skill Department	Area(s) in which PhD is offered
1	SFET	Automotive Studies	Material Development and Testing, Tribology and Wear, Industrial Engineering and Automation Multiphase Fluid Flow, Slurry Transportation, Rheology of Slurry Flow, Erosion Wear; Smart Material and Structures
		Computer Science Engineering	Image Processing, Machine Learning, ANN, Privacy Preservation, ASR, NLP, IOT, Blockchain Technology, Wireless Sensor Network NLP, Speech Technology, AI/ML; Human computer Interaction, Big Data, Computer Network; Networking; Cyber Security, Artificial Intelligence; Deep Learning/Machine Learning
		Industry 4.0	Electronics and Communication Engineering (VLSI, Quantum Dot Cellular Automation, and others); Quantum Cellular Automata (Siqad/QCAD-E), Electromigration & IR and Lower-tech node High frequency leakage power; VLSI & Microsystem Technology, Bio-MEMS Devices, Energy storage devices; IOT, Embedded System, VLSI Design
		Green Technology	Thermal Engineering (Refrigeration and Air conditioning, Solar thermal, Energy conversion, cogeneration, power plants, heat transfer) Electrical Machines, Power Electronics and Control Engineering, Electric Vehicles, Renewable Energy, Power System;

			PFC DC/DC Converters, Power Quality, Solar PV, SMPS, Micro Grid, Electric Vehicles, AI/ ML application in the field of Electrical Engineering, Energy Storage Devices etc.
2	SFMSR	Banking and Finance	Management
		Tourism and Hospitality	Hospitality (Hotel, Hospitality, Culinary, Culture, Performance and Change Management; Tourism, CSR)
		Management Studies	Management
3	SFASH	Language & Culture (English)	Interdisciplinary- English language/Literature with Management; ELT, Stylistic Study, Linguistic Study and Indian English Literature; American, African-American and Indian Literature, English Literature, Literary Theory and Criticism
		Psychology & Behavioural Science (Psychology)	Clinical Psychology, Criminal and Forensic Psychology, Educational Psychology, Social Psychology, Guidance and Counselling Psychology, Experimental Psychology; Industrial & organisational Psychology, Experimental Psychology
		Science & Computation (Mathematics)	Functional Analysis, Operator Theory; Numerical Analysis/ Computational Fluid Dynamics

Note: The syllabus for of the PhD entrance exam is attached at Annexure 1-4.

Ph.D. SEAT MATRIX - (2024-25)

The seat matrix for PhD Admission for 2024-2025 (July Session), SVSU, Palwal, Haryana

Faculty Wise distribution of PhD Seats

Faculty	Total PhD Seats		Total	AIC		HOGC		SC		BC		PWD
			100	15		42.5		17		22.95		2.55
	Session 2024-25	PhD candidates admitted under the previous advertisement	Total	AIC	AIC-EWS	HOGC	HOGC-EWS	SC	SC-D	BC-A	BC-B	PWD
			100	13.5	1.5	38.25	4.25	8.5	8.5	13.6	9.35	2.55
SFASH	22	4	26	4	0	10*	1	2	2	4	2	1
SFMSR	50	2	52	7	1	20**	2	5	4	7	5	1
SFET	77	0	77	10	1	30	3	6	7	11	7	2
Total	149	6	155	21	2	60	6	13	13	22	14	4

*10 – 4 = 6 seats available for the session 2024-25. ** 20 – 2 = 18 seats available for the session 2024-25

Department Wise distribution of PhD Seats-SFASH

Department	Total PhD Seats		Total	AIC		HOGC		SC		BC		PWD
			100	15		42.5		17		22.95		2.55
	Session 2024-25	PhD candidates admitted under the previous advertisement	Total	AIC	AIC-EWS	HOGC	HOGC-EWS	SC	SC-D	BC-A	BC-B	PWD
			100	13.5	1.5	38.25	4.25	8.5	8.5	13.6	9.35	2.55
Psychology & Behavioural Sciences	4	3	7	1	0	3*	0	1	0	1	1	0
Science & Computation	7	0	7	1	0	3	0	0	1	1	1	0
Language & Culture	11	1	12	2	0	4**	1	1	1	2	1	0
Total	22	4	26	4	0	10	1	2	2	4	3	0

*No seats for the session 2024-25 are available as 3 seats are already filled under the previous advertisement.
** 4 – 1 = 3 seats available for the session 2024-25 as 1 seat is already filled under the previous advertisement.

Department Wise distribution of PhD Seats-SFET

Department	Total PhD Seats		Total	AIC		HOGC		SC		BC		PWD
			100	15		42.5		17		22.95		2.55
	Session 2024-25	PhD candidates admitted under the previous advertisement	Total	AIC	AIC-EWS	HOGC	HOGC-EWS	SC	SC-D	BC-A	BC-B	PWD
			100	13.5	1.5	38.25	4.25	8.5	8.5	13.6	9.35	2.55
Automotive Studies	20	0	20	3	0	7	1	1	2	3	2	1
CS/IT	25	0	25	3	1	10	1	2	2	3	2	1
Industry 4.0	11	0	11	2	0	4	1	1	1	1	1	0
Green Technology	21	0	21	3	0	8	1	2	2	3	2	0
Total	77	0	77	11	1	29	4	6	7	10	7	2

Department Wise distribution of PhD Seats-SFMSR

Department	Total PhD Seats		Total	AIC		HOGC		SC		BC		PWD
			100	15		42.5		17		22.95		2.55
	Session 2024-25	PhD candidates admitted under the previous advertisement	Total	AIC	AIC-EWS	HOGC	HOGC-EWS	SC	SC-D	BC-A	BC-B	PWD
			100	13.5	1.5	38.25	4.25	8.5	8.5	13.6	9.35	2.55
Banking & Finance	10	0	10	2	0	4	0	1	1	1	1	0
Management Studies	30	2	32	4	1	12*	2	3	2	4	3	1
Tourism & Hotel Management	10	0	10	2	0	4	0	1	1	1	1	0
Total	50	2	52	8	1	20	2	5	4	6	5	1

*12 – 2 = 10 seats available for the session 2024-25 as 2 seats are already filled under the previous advertisement.

Note: Number of Ph.D. seats may increase or decrease in any of the Skill Faculty/Department.

The reservation policy of the Haryana Govt. shall be applicable and all the reserved seats are meant for Haryana Domicile candidates only. Reservation certificate must be signed by Tehsildar of concerned area of Haryana State. Format as per Haryana State Technical Education Society.

ADMISSION PROCEDURE AND REQUIREMENTS

1. The university shall admit students who qualify for fellowship/scholarship in UGCNET/UGC- CSIR NET/GATE/CEED and similar National level tests based on an interview.
2. The university shall admit students, who have not qualified UGC-NET/UGC- CSIR NET/GATE/CEED and similar National level tests, through an Entrance Test. The Entrance Test syllabus shall consist of 50% of Research Methodology, and 50% shall be subject specific. Test syllabus of Research Methodology will be same for all disciplines (Annexure 1).

3. Students who have secured 50 % marks in the entrance test are eligible to be called for the interview.
4. A relaxation of 5 % marks will be allowed in the entrance examination for the candidates belonging to SC/ST/OBC/differently-abled category, Economically Weaker Section (EWS), and other categories of candidates as per the decision of the Commission from time to time.
5. The university shall decide the number of eligible students to be called for an interview based on the number of Ph.D. seats available.
6. Provided that for the selection of candidates based on the entrance test conducted by the university, a weightage of 70% for the entrance test and 30 % for the performance in the interview shall be given.
7. The performance of the student during interview will be assessed on the basis of understanding of industry-based research and its impact on socio-economic areas through presentation.

FEE STRUCTURE

(a) Course work fee Rs. 20000 / per semester
(b) Course work Examination fee Rs. 3000.
(c) Caution Money (Refundable): Rs. 5000/- one time.
(d) Registration Fee Rs. 1000/-
(e) After completion of course work, Semester fee: Rs. 20000/- per semester
(f) Thesis evaluation fee Rs. 20000/- at the time of submission of Ph.D. thesis

FINANCIAL ASSISTANCE

1. Research scholars who are working in projects as JRF and SRF shall get financial assistance from the fund of the projects.
2. The Scholars admitted to Ph.D under the Regular scheme are eligible for the Skill University Teaching Assistantship (SUTA) subject to fulfilment of eligibility criteria for the post of Guest Faculty in the respective Department, for which:
    i) The selection process for the above financial assistance will adhere to SVSU Guest Faculty norms, with a maximum limit of Rs. 50,000 per month.
    ii) They can work for a maximum of 8 hours per week in the Departments to earn this assistantship subject to the availability of the teaching load.

iii) Renewal of assistantship every semester will be contingent on enrolment, satisfactory progress in research work and good performance during the preceding semester in the discharge of responsibility as a teaching assistant.

3. For Full-time Ph.D. scholars who do not have any financial assistance will be eligible for financial assistance ship. Each Skill Faculty will have two scholarships every year. The scholarship will be University Research Scholarship (URS), and it will be awarded on the basis of the joint merit of the entrance test and interview. The amount of this scholarship shall be Rs. 15,000/- per month. It will be tenable for two years in the first instance. This scholarship may be extended only for a period not exceeding one year i.e. 3rd year.
4. Each scholar receiving this scholarship shall also receive a contingency grant of Rs. 5000/- per annum. This amount may be utilized on apparatus, chemicals, books and journals, Photostat copies, macro films, typing, stationery, postage and field work/travel, conference/workshops needed in connection with the approved research projects. The contingency grant is not intended for making payment of examination and other fees.
5. Financial assistance shall not be provided where the research scholar is availing paid study leave.
6. To avail university research scholarship, the student will have to submit Parivar Pahchan Patra (PPP) issued by the State Govt. of Haryana.

***Important Instructions/Guidelines for filling Online Application Form (to be finalized by it cell, however sample guidelines are mentioned below)**

1. Prerequisites for applying Online Application Form.

a) PhD brochure 2024-25 www.svsu.ac.in

b) Your email id (e.g. xyz@ XXXX.com)

c) Scanned copy of Photograph, Signature ensuring that all required scanned images should be in .jpeg format with below specification:

i) File Size of the photo image must be less than 50 KB

ii) File Size of the signature image must be less than 30 KB

d) Mobile Number of the candidate

e) Pin Code with the details of Permanent & Correspondence Address.

f) Scanned copy of Educational Qualifications & Weightages related details/documents (like Matriculation, Senior Secondary, and Degree etc.)

g) Scanned copy of NOC, if Appling for part time PhD

2. The candidate must upload all required scanned images/scanned copies only in .jpeg format. The scanned copy should be of original document and not of the Photocopy.

3. Read the General Instructions & Prospectus carefully and then start the process

4. Please read the user manual available on the website/portal before filling the application form.

5. The candidate must select carefully the program applied for which he/she is eligible. No change of Program shall be allowed after fee payment.

6. Online Process: - A Candidate must apply online through the website www.svsu.ac.in->Admission- >Online Application form PhD 2024-25.

7. Candidate must create login account for the registration process.

8. The University in no way shall be responsible for any lapse occurring on account of incorrect information provided by the candidate.

9. It is solely the responsibility of the candidates to verify their personal data including Category, Sub category, Residential Status, Gender etc. are consistent with documentary evidence.

10. If the personal data submitted /entered by the candidates are found to be wrong at the time of verification of certificates by the admission committee produced/made available by the candidate through offline mode, the provisional allotment of seat is liable to be cancelled.

11. The candidate should select the appropriate Skill Faculty from the drop-down menu.

12. Before making payment, the candidate should check & confirm all the details filled in the application form. System not allowed changing in the filled data of application form once the fee has been paid.

13. Applications without fee shall not be entertained and would be summarily rejected.

Note: The candidate must upload all required scanned images/scanned copies only in .jpeg format. The scanned copy should be of the original document and not of the Photocopy. List of Documents to be uploaded for admission to Ph.D. program.

1. Matriculation Certificate (as proof of age)
2. Senior Secondary Examination Certificate
3. Detailed Marks Card (DMC) of the qualifying examination (UG & PG)
4. Character Certificate from the institute last attended

5. Certificate of Reserved Category and other related certificates, if applicable, as mentioned in the Prospectus
6. Latest income certificate issued by the competent authority of the Haryana Govt. on or after 01.04.2023, wherever applicable.
7. Certificate claiming weightage, Haryana resident certificate, if applicable
8. NOC from the Employer, as applicable.

Annexure A

NO OBJECTION CERTIFICATE FROM EMPLOYER

It is certified that _____ S/o Sh. _____ is working as _____ in our Organization/Department. The organization has no objection to her/his pursing Ph.D. Program in the SVSU University, Palwal. If selected in the Ph.D. program, she/he shall be relieved from duties to pursue pre-Ph.D. course work in the university and to pursue her/his research work as and when required.

Dated_____ Signature & Designation of the employer (with seal)

Annexure - 1

Syllabus for PhD Entrance Test

PART-1 (Common for All)

Research Methodology

Basic statistics: Sources and type of data: quantitative and qualitative data: diagrammatic and graphical representation of data. Mean, median, mode, geometric mean, harmonic mean and other measures of central tendency, measure of dispersion. mean deviation. quartile deviation, standard deviation. variance, coefficient of variation, skewness, kurtosis. moments, correlation and regression, elementary probability theory. Baye's theorem. Poisson, Normal and Binomial distributions.

Research Methodology: Nature and Scope of Research Methodology. Problem Formulation and Statement, Research Objectives: Research Process; Research Designs Exploratory. Descriptive and Experimental; Hypothesis formulation and testing of hypothesis. Sampling and Sampling Design Methods. Data Collection methods, tools and techniques Observational and Survey Methods; Questionnaire and Interviews. Data analysis techniques

Aptitude: Understanding the Structure of Argument. Evaluating and distinguishing Deductive and Inductive Reasoning. Analytical Reasoning. Verbal Analogies, Word Analogy Applied Analogy. Verbal Classification Numerical computation & estimation numerical reasoning and data interpretation.

Annexure – 2

Syllabus for Entrance Test

Part – 2 (Domain Specific)

Skill Faculty of Engineering and Technology

Skill Department of Automotive Studies

Automotive fundamentals

Power Cycles, Engine Control, Ignition System. Drive Train. Transmission. Brakes. Steering System. Battery. Starting System. Automotive Instrumentation and Communication, Vehicle Motion Control. Automotive Diagnostics, Expert Systems, Industrial automation, Mechatronics systems. Alternative Vehicles.

Mechanical engineering science

Fluid (Pneumatic and hydraulic) properties, flow of incompressible fluids, fluid statics, volume analysis of mass, momentum and energy. continuity equation. Thermodynamic system and processes, behaviour of ideal and real gases, properties of pure substances, calculation of work and heat in ideal processes. Modes of heat transfer, conduction, convection and radiation, electrical analogy, steady and unsteady heat transfer, thermal boundary layer, heat exchanger performance. LMTD and NTU methods. Power engineering: compressors. Refrigeration and air-conditioning: Turbomachinery: velocity diagrams, impulse and reaction turbines

Design and materials fundamentals

Principal stresses and strains, stress-strain relations, uniaxial loading. thermal stresses, shear force and bending moment, torsion of circular shafts, structure and properties of engineering materials, Ferrous and non-ferrous materials, Heat treatments, TTT curve, polymers and composites, smart materials, material testing with UTM, hardness and impact strength. Dynamic analysis of linkages, cams, gears and gear trains, flywheels and governor, gyroscope. Design of static and dynamic loading, failure theories, design of joints, transmission drives, springs and bearings, basic criteria of selection of material, factor of safety. Tribology of materials, dry sliding and erosion wear.

Manufacturing Science

Fundamentals of manufacturing processes, Casting, forming and joining processes, metal working, Hot and cold working: forging, rolling, extrusion, drawing, sheet metal, machine tools, tool geometry and materials, economies of machining, non-traditional machining processes, micro machining, work holding devices, jigs and fixtures, dies and punches. Powder Metallurgy, metal powders, compaction and sintering, powder forging. CIM, CAD/CAM. CMP. cellular manufacturing. NC. CNC, DNC. Robotics. FMS, Manufacturing technologies strategies and selection, metrology and inspection.

Industrial management

Production Planning and Control. Forecasting models, aggregate production planning. scheduling, materials requirement planning. Inventory Control, Operations Research. Linear programming, simplex, transportation and assignment model, network flow models, simple queuing models, PERT and CPM.

Skill Department of Computer Science Engineering (CS/IT)

Discrete Structure

Sets, functions, relations, counting; generating functions, recurrence relations and their solutions; algorithmic complexity, growth of functions and asymptotic notations. Programming,

Data Structures and Algorithms

Data types, control structures, functions/modules, object-oriented programming concepts: sub- typing, inheritance, classes and subclasses, etc. Basic data structures like stacks, linked list. queues, trees, binary search tree, AVL and B+ trees; sorting, searching, order statistics, graph algorithms, greedy algorithms and dynamic programming

Computer System Architecture

Boolean algebra and computer arithmetic, flipflops, design of combinational and sequential circuits, instruction formats, addressing modes, interfacing peripheral devices, types of memory and their organization, interrupts and exceptions.

Operating Systems

Basic functionalities, multiprogramming; multiprocessing, mút threading, timesharing, real- time operating system; processor management, process synchronization, memory management, device management, File management, security and protection; case study: Linux.

Software Engineering

Software process models, requirement analysis, software specification, software testing, software project management techniques, quality assurance.

DBMS and File Structures

File organization techniques, database approach, data models, DBMS architecture; data independence, E-R model, relational data models, SQL, normalization and functional dependencies.

Computer Networks

ISO-OSI and TCP/IP models, basic concepts like transmission media, signal encoding, modulation techniques, multiplexing, error detection and correction; overview of LAN/MAN/ WAN; data link, MAC, network, transport and application layer protocol features; network security.

Artificial Intelligence and Machine Learning

Uninformed and informed search techniques; Knowledge and Reasoning; Supervised, unsupervised and Reinforced machine learning methods, Parametric and non-parametric methods, Overfitting/under fitting & Regularization, Curse of Dimensionality. Mixture Models. Basics of image processing, enhancement, features, matching.

Optimization: Linear Programming

Mathematical Model, Graphical Solution, Simplex and Dual Simplex Method, Sensitive Analysis; Integer Programming, Transportation and Assignment Models, PERT-CPM: Diagram Representation, Critical Path Calculations, Resource Levelling, Cost Consideration in Project Scheduling.

Computer Graphics & Image Processing

Video-Display Devices, Raster-Scan and Random-Scan Systems; Graphics Monitors, Input Devices, Points and Lines; Line Drawing Algorithms, Mid-Point Circle and Ellipse

Algorithms; Scan Line Polygon Fill Algorithm, Boundary-Fill and Flood-Fill, 2-D and 3-D Geometrical Transforms

Elements of digital image processing, Image model, Sampling and quantization. Discrete Fourier Transform, Discrete Cosine Transform, Haar Transform, Enhancement by point processing, Spatial filtering, Dilation and Erosion

Skill Department of Industry 4.0

Networks: Network graphs: matrices associated with graphs; incidence, fundamental cut set and Fundamental circuit matrices. Solution methods: nodal and mesh analysis. Network theorems: superposition. Thevenin and Norton's maximum power transfer. Wye-Delta transformation. Steady state sinusoidal analysis using phasors. Linear constant coefficient differential equations: time domain analysis of simple RLC circuits, Solution of network equations using Laplace transform: frequency domain analysis of RLC circuits. 2-port network parameters: driving point and transfer functions. State equations for networks.

Electronic Devices: Energy bands in silicon, intrinsic and extrinsic silicon. Carrier transport in silicon: diffusion current, drift current, mobility, and resistivity. Generation and recombination of carriers. p-n junction diode, Zener diode, tunnel diode, BJT, JFET, MOS capacitor, MOSFET, LED. p-1-n and avalanche photo diode, Basics of LASERS. Device technology: integrated circuits fabrication process oxidation, diffusion, ion implantation, photolithography, n-tub, p-tub and twin-tub CMOS process.

Analog Circuits: Small Signal Equivalent circuits of diodes, BJTS, MOSFETs and analog CMOS. Simple diode circuits, clipping, clamping, rectifier. Biasing and bias stability of transistor and FET amplifiers. Amplifiers: single-and multi-stage, differential and operational, feedback, and power. Frequency response of amplifiers. Simple op-amp circuits. Filters. Sinusoidal oscillators: criterion for oscillation: single-transistor and op-amp configurations. Function generators and wave-shaping circuits. 555 Timers. Power supplies.

Digital circuits: Boolean algebra, minimization of Boolean functions; logic gates, digital IC families (DTI. TTL, ECI, MOS. CMOS). Combinatorial circuits: arithmetic circuits, code converters. multiplexers, decoders. PROMs and PLAs. Sequential circuits: latches and flip-

flops, counters and shift- registers. Sample and bold circuits, ADX DACS Semiconductor memories, Microprocessor (8085): architecture, programming, memory and 1-4) interfacing.

Signals and Systems: Definitions and properties of Laplace transform, continuous-time and discrete- time Fourier series, continuous-time and discrete-time Fourier Transform, DFT and FFT, z-transform. Sampling theorem. Linear Time-Invariant (LTI) Systems, definitions and properties, causality, stability. impulse response, convolution, poles and zeros, parallel and cascade structure, frequency response, group delay, phase delay. Signal transmission through LTI systems.

Control Systems: Basic control system components; block diagrammatic description, reduction of block diagrams. Open loop and closed loop (feedback) systems and stability analysis of these systems. Signal flow graphs and their use in determining transfer functions of systems; transient and steady state analysis of LTI control systems and frequency response. Tools and techniques for LTI control system analysis: root loci. Routh-Hurwitz criterion. Bode and Nyquist plots. Control system compensators: elements of lead and lag compensation, elements of Proportional-Integral-Derivative (PID) control. State variable representation and solution of state equation of LTI control systems.

Communications: Random signals and noise: probability, random variables, probability density function, autocorrelation, power spectral density. Analog communication systems: amplitude and angle modulation and demodulation systems, spectral analysis of these operations, superheterodyne receivers; elements of hardware, realizations of analog communication systems; signal-to-noise ratio (SNR) calculations for amplitude modulation (AM) and frequency modulation (FM) for low noise conditions. Fundamentals of information theory and channel capacity theorem. Digital communication systems: pulse code modulation (PCM), differential pulse code modulation (DPCM), digital modulation schemes: amplitude. phase and frequency shift keying schemes (ASK, PSK, FSK), matched filter receivers, bandwidth consideration and probability of error calculations for these schemes. Basics of TDMA. FDMA and CDMA and GSM.

Electromagnetics: Elements of vector calculus: divergence and curl; Gauss' and Stokes' theorems, Maxwell's equations: differential and integral forms. Wave equation, Poynting

vector. Plane waves: propagation through various media; reflection and refraction; phase and group velocity, skin depth. Transmission lines: characteristic impedance; impedance transformation; Smith chart; impedance matching: S parameters, pulse excitation.

Waveguides: modes in rectangular waveguides: boundary conditions, cut-off frequencies: dispersion relations. Basics of propagation in dielectric waveguide and optical fibers. Basics of Antennas: Dipole antennas, radiation pattern; antenna gain.

Skill Department of Green Technology

Basic Electrical and Circuit Analysis

AC and DC Circuit Analysis, series and parallel resonance, nodal analysis, mesh analysis, time domain and frequency domain analysis of simple RI.C circuits, power factor, star and delta connected loads, thevenin theorem, Norton theorem, superposition theorem, maximum power transfer theorem, reciprocity theorem.

Electrical Machines

Transformers, D.C Machines: DC motor and DC generator, Induction Machines: Single phase and Three phase Induction Motor, Synchronous Machines: Synchronous motor and Synchronous generator, Industrial Applications of electrical machines.

Control Systems

Introduction to control systems, Mathematical Models of Physical Systems, Representation of Control Components. Time domain analysis and design specification of linear systems: Concepts of Stability and Routh Hurwitz Criterion, Root Locus Technique, Frequency Response Analysis and Stability Studies in Frequency Domain, Design and Compensation Technique, Introduction to State Variable Approach.

Power Systems

Per Unit system, Distribution systems, electrical design of overhead lines, mechanical design of overhead lines, insulators, insulated cables, transmission and performance, corona, inductive interference; short circuit analysis, protective relays, protective relaying schemes protection of feeders & transmission lines, transformers and alternators, circuit interruption devices.

Power Electronics and Drives

Familiarization with semiconductor devices including Diode, Thyristor, BJT, MOSFET, IGBT, GTO, TRIAC, DIAC, Operation and analysis of: Uncontrolled and Controlled Rectifier, DC-DC Converters, Inverters, Cycloconverters, AC voltage Regulators, Different switching topologies, Basic applications of PE Converters in Home appliances & Industry, Drives for E-vehicles

Annexure – 3

Syllabus for Entrance Test

Part – 2 (Domain Specific)

Skill Faculty of Management Studies and Research

Management Process and Organizational Behavior

Evolution of management thought: Systems and contingency approach for understanding organizations; Managial processes, functions, skills and roles in an organization; Social Responsibility of Business; Understanding and Managing individual behaviour, Personality; Perceptions: Attitudes: Learning; Decision-making; Management by Objectives; Understanding and managing group processes- interpersonal and group dynamics: Applications of Emotional Intelligence in organizations. Leadership and influence process; Work Motivation. Understanding arid Managing organizational system Organizational design and structure, Work stress, Organizational Change and development; Conflict Management; Stress Management.

Managerial Economics

Nature and scope of Managerial Economics. Importance of Managerial decision-making; Marginal analysis, Objective of a firm, Demand function, Elasticity of demand and its significance in Managerial decision-making: Consumer equilibrium-utility and indifference curve approach; Price, income and substitution effects; Fundamentals of demand estimation and forecasting; Short-run and long-run production functions

Business Environment

Nature, components and determinants of business environment, dynamics of business environment, key indicators; Risk in business environment, Assessing business environment country risk and political risk.

Current state of business environment in India Economic reforms Liberalization, privatization, globalization, industrial policy and industrialization trends, public enterprise reforms and disinvestment programmes; competitive environment; financial environment

Business Communication

Importance and nature of business communication, Effective communication skills, Process of communication Oral and Non-Verbal communication, Barriers and gateways in communication and Do's and Don'ts of business writing. Commercial letters: Writing business and academic reports; Public speaking, listening and Negotiations; conducting and attender interview and meetings. Emotional Intelligence

Accounting for Managers

Management Accounting: Nature, scope and tools of Management Accounting: Management Accounting vs. Financial accounting, Financial analysis, Ratio analysis, Funds-Flow Statement, Cash-tlow Statement

Budgeting: Types of budgets and their preparation. Performance budgeting and Zero-base budgeting. Overview of latest developments in Accounting: Transfer Pricing, Responsibility, accounting. Inflation accounting, Divisional performance analysis, Human Resources Accounting

Marketing Management

Nature, scope and concept of marketing, Corporate orientations towards the marketplace; The Marketing, environment and Environment scanning; Marketing information system and Marketing research; Understanding consumer and Industrial markets; Market segmentation, Targeting and positioning; Product decisions-product mix, product life cycle, new product development, branding and packaging decisions; Pricing methods and strategies. Promotion decisions promotion mix, advertising, sales promotion, publicity and personal selling; Place Decisions; Distribution Channels, Physical Distribution, Selection of distribution channel: consumer buying behavior; International Marketing Management; Ethics in Marketing; Contemporary issues in marketing Globalization, Consumerism, Green Marketing, Direct Marketing, Network Marketing, Event Marketing.

Human Resource Management

Concepts and Perspectives on Human Resource Management; Human Resources Management in a changing environment; Corporate objectives and Human Resource Planning: Career and succession planning; job analysis; Methods of manpower search; Attracting. Selecting and retaining human resources; Induction and socialization; Manpower training and development; Performance appraisal and potential evaluation;

Job evaluation and compensation; Employee welfare; Industrial relations & trade unions; Dispute resolution & grievance management, Employee empowerment.

Production and Operations Management

Nature and Scope of Production and Operations Management; Strategy: Operations Strategy, Competitive Capabilities and Core Competencies, Operations Facility Location; Types of Manufacturing Systems and Layouts; Layout Planning and Analysis; Material Handling; Total Quality Management; Project Management: Supply Chain Management: Value Engineering; Just-In-Time

E-Commerce

Introduction to Electronic Commerce: Framework, applications; network infrastructure (including internet). Internet commercialization

Electronic payment system, inter-organizational commerce & intra-organisational commerce, Security, advertising & marketing on the internet, introduction to e CRM, consumer search & resource discovery, computer-based education & training, digital copyrights.

Business Policy and Strategic Management

An Introduction to business policy Nature, Objective and importance of business policy. An overview of strategic management; Strategic decision making: Process of strategic 4ecision making.

Types of planning systems - corporate planning, strategic planning and long-range planning: Strategy Formulation, Company's mission, purpose and objectives; Corporate strategy concept, significance and objectives; types of strategies; Environmental and organizational appraisal (Internal & external) techniques of business environment analysis. Strategic alternatives and choice; Business ethics and corporate strategy Concept of value chair and competitive advantage.

Entrepreneurship Development

Significance of Entrepreneur in Economic Development; Economic, Social and psychological need for entrepreneurship; Characteristics, qualities and pre-requisites of entrepreneur; The function of the entrepreneur in economic development of a Country; Methods and procedures to start and expand one's own business; Life cycle of new

business and relationship with large enterprises; Achievement motivation; Environmental Factors affecting success of a new business; Reasons for the failure and visible problems for business.

Financial Management

Corporate Financial Objectives and Functions, Introduction to financial management, Objectives of financial management; Time value of money, sources of finance, Financial Analysis; Comparative Balance Sheet, Common Size Statement Analysis, Trend and Ratio Analysis; Capital Budgeting and its methods, Risk analysis: Cost of capital: Concept and importance,

Capital Structure Theories and Applications, Corporate Investment Decisions: Estimation of Cash Flows and Analysis Techniques, Cash Flow Projection and Evaluation Techniques; Valuation of the Firm; Working Capital Planning, Monitoring and Control of Working Capital. Working Capital Financing Managing the Components of Working Capital, Dividend and Valuation, Irrelevance and Relevance of Dividends, Determinants of Dividends Policy and Dividend Policy of Companies

Banking & Finance

Financial Markets: Bole in Financial Development. Government Economic Philosophy and Financial Market. Structure of Financial Market in India. Critical Evaluation of the Development and Future Trends. Financial Market Systems and Regulations in India Money Market, Capital Market and Their Components. Primary Market Intermediaries. Secondary Market System. Regulations and Regulatory Agencies (Primarily SEBI, Role of ETFs, MFs and Investment Bankers: Risk and Risk Management, Process Associated with insurance. Objectives of Risk Management; Role of Risk Pooling and Insurance, Institutions for Insurance and Reinsurance - Economic Rationale and requirements, Insurance Laws and Regulation, Insurance Pricing, Corporate Risk Management and Insurance: Role of Financial Institutions to Financial Development, Banking and Non-Banking Financial Institutions, Investment Banking

Annexure – 4

Syllabus for Entrance Test

Part – 2 (Domain Specific)

Skill Faculty of Applied Sciences and Humanities

Department of Language and Culture (English)

There shall be 50 Multiple Choice Questions of one mark each from the following areas:

1. British literature from Chaucer to Contemporary Times

2. English in India: History, Evolution and Futures

3. American and Other Non-British Literatures in English

4. Literary Criticism

5. Literary and Critical Theory of the 20th Century

6. Cultural Studies

7. Language: Basic concepts, theories and pedagogy. English in Use.

8. Research Methods and Materials in English

Department of Psychology & Behavioral Science (PSYCHOLOGY)

General Psychology

Perception: Perceptual processing, Role of attention in perception, Perceptual organization, Perceptual sets, Perceptual constancies, Depth perception, Illusions.

Learning: Principles and applications of Classical conditioning, Operant conditioning, and Observational learning; Cognitive influences on learning;

Memory & Forgetting: Sensory memory, STM, LTM, working memory, Meta-memory: Semantic & Episodic Memory procedural memory Models of Semantic knowledge, The Atkinson and Shiffrin model, Forgetting- Due to decay, due to interference, forgetting and retrieval inhibition. Theories of forgetting, Mnemonics

Intelligence: Nature and Theories of intelligence- Gardner, Sternberg, Das and Naglieri, measurement of intelligence, the cognitive and neural basis of intelligence, heredity, environment and intelligence.

Motivation: Meaning and Definition of Motivation, Need, Drive and Incentives. Theories of motivation- Drive theory, Arousal theory, Expectancy theory, Maslow's need hierarchy theory. Forms of human needs and motivation- hunger, need for achievement, need for affiliation, need for power.

Emotion: Nature and Definition of Emotion, Brief description of Cannon-Bard, James-Lange and Schachter-Singer theories of emotion; Expression of emotion.

Systems and Theories in Psychology: Introduction- Systems and theories: An overview of history and schools of psychology. Early schools of Psychology: Structuralism (Tichner), Functionalism (William James), Behaviorism (Watson), Gestalt psychology (Wertheimer, Koffka and Kohler)

Personality theories: Trait (Biological) and Type Theories: Allport, Cattell, Eysenck, Sheldon and Friedman, Alternative Five Factor Model. The Freudian Theory; The Neo Analytic Theory; Karen Horney; Erik Erikson: Harry Stock Sullivan; Skinners Radical Behaviours, Social Learning Theory; Social cognitive Theory; Bandura, Abraham Maslow's and Carl Rogers' Theory, Kelly and Rollo May.

Cognitive Psychology

Historical Background: Psychophysical approach, Information processing approach, Ecological Approach, Contemporary Cognitive Psychology.

Attention and Perception: Theories of Attention and current developments: Broadbent's filter theory, Triesman's attenuation theory, automatic and controlled processing, switching attention.

Perceptual learning and development, Perception of shape, space and movement, Implicit perception and sensory integration theory, Cognitive – Attention Theory: Information Processor, Cognitive Timer

Learning and Language Disorder: General Phenomenon of Learning: Learning vs Maturation, Native Response Tendencies, Verbal learning: Stimulus material, Trigram Methods-Serial Learning, Paired Associate Learning, Discrimination Learning: Nature,

Theories- Algebraic Summation Theory, Relational Theory, Learning disorders: Transposition Effect Reading Disorder/Developmental Dyslexia, Disorder of written expression / Dysphasia / Aphasia, Math Disability / Dyscalculia, Auditory Processing Disorder, Speech and Language pathology, Specific language Impairment

Thinking and Language Formation: Concept formation and categorization, Judgment and Decision-making, Reasoning & Problem solving: Stages – Preparation, Production, Judgment and Incubation, Structure of language, its acquisition and Formation, Language and Thinking: Linguistic Determinism, language and Cognition

Social Psychology

Attitude and Attitude Change: Attitude - Behaviour Link: Influence of attitude on behavior: responsible factors – aspects of the situation, aspects of the attitude, Attitude Change: Approach to attitude change- Persuasion approach, cognitive approach, Attitudes resistto change: reactance, forewarning, selective avoidance, active defense biased assimilation and attitude polarization

Pro-social Behaviour: Concept of Pro-social Behaviour, Latance Darley‘s five step model, situational factors: Attraction, Attributions and Pro-social Models, Theories of Prosocial Behaviour: Empathy - Altruism Theory, Egoistic Theory, Genetic Selfishness

Social Issues: Mass violence, Terrorism, Mob behavior, Natural Disaster, Environmental stresses and social behavior, Social psychological perspectives on health and illness, Psychological effects of unemployment, Social and ethnic minorities and law

Applied Social Psychology: Applied Social Psychology in India: Challenges and possibilities need for indigenization, Applied Social Psychology and developing countries; Emerging themes, Multidisciplinary approach to the study of social change; Policy oriented research; need for reorienting Social Psychology, Methods of Applied Social Psychology: Laboratory experiment, Field experiment, Field study.

Psychopathology

Classification and Theoretical Models: Systems of Classification, basic features; DSM-IV TR, ICD-10, similarities and differences, Major Theoretical Models of Psychopathology: The medical model, Psychoanalytic model, Behaviouristic model, Humanistic-existential models, Interpersonal approach, Systems approach.

Diagnosis and Prognosis: Problems and methods of diagnosis: physiological examination, observation, case-history, interview method, psycho-diagnostic tests, measures of bodily functions, computer assisted diagnosis.

Mood and Anxiety Disorder: Bipolar disorders: Manic, Depressive, Mixed, Depressive disorder: Major depression and dysthymia, Suicide, Anxiety Disorders: Generalized anxiety disorder, phobia, panic disorder, post traumatic stress disorder and obsessive compulsive disorder

Major Clinical Disorders: Schizophrenia, Other psychotic disorders: Bipolar, Delusional, psychotic depression, Conversion disorder, Somatization disorder, Hypochondriasis, Body dysmorphic disorder, Pain disorder, Developmental disorder: PDD, Rett Disorder, Asperger Disorder, Behavioral Disorder: Conduct Disorder, Hyperactivity Disorder, ADHD, Genetic Disorders: Down Syndrome

Psychotherapy

Psychoanalytic Therapies: Freud's Psycho-analytic Therapy, Adlerian Psychotherapy, Brief Dynamic Therapies

Humanistic Therapies: Client-Centered Therapy, Existential Therapy and Gestalt Therapy

Behavioral and Cognitive Behavior Therapy: Behavioral therapy, Cognitive Behavior therapy, Rational Emotive Behavior Therapy (Ellis)

Other Important Therapies: Family, Marital and Interpersonal Therapy, Therapies with Children and Adolescents, Group Therapy, Psychotherapy in the Indian context, Spirituality and psychotherapy, Yoga and Meditation

Clinical & Counseling Psychology

Development of clinical Psychology as a profession: Consultation, administration. Subspecialties of clinical Psychology: Clinical health Psychology, Forensic Psychology, Geropsychology, Clinical Neuropsychology, and child clinical psychology.

Diagnosis and assessment: Nature and purpose of Clinical diagnosis & assessment, Stages in the Assessment Process, Clinical Assessment Techniques: observation, interview, case-study, Psychological tests. Counseling Process: Settings for counseling, Steps in counseling, Therapeutic relationship:

Counseling Approach: Psychodynamic Approach: Psychoanalytic, Adlerian, Humanistic Approach: Existential, Client-centered, Gestalt, Behavioural Approach: Operant-Conditioning, Classical-Conditioning, Cognitive Approach: Cognitive Therapy, Rational emotive therapy, Other Approaches: Narrative Therapy, Expressive Therapy, and Biofeedback.

Current Issues in Counseling: Ethical Issues: Professional Codes, our divided loyalties, Areas of ethnical difficulty, recent trends Legal Issues: Advice for the passionately committed counseling student, Mental Health Counseling, Counseling diverse population.

Department of Science & Computation (MATHEMATICAS)

Analysis: Elementary set theory, finite, countable and uncountable sets, Real number system as a complete ordered field, Archimedean property, supremum, infimum.

Sequences and series, convergence, limsup, liminf. Bolzano Weierstrass theorem, Heine Borel theorem. Continuity, uniform continuity, differentiability, mean value theorem. Sequences and series of functions, uniform convergence. Riemann sums and Riemann integral, Improper Integrals. Monotonic functions, types of discontinuity, functions of bounded variation, Lebesgue measure, Lebesgue integral.

Functions of several variables, directional derivative, partial derivative, derivative as a linear transformation, inverse and implicit function theorems.

Metric spaces, compactness, connectedness. Normed linear Spaces. Spaces of continuous functions as examples.

Linear Algebra: Vector spaces, subspaces, linear dependence, basis, dimension, algebra of linear transformations. Algebra of matrices, rank and determinant of matrices, linear equations. Eigenvalues and eigenvectors, Cayley-Hamilton theorem. Matrix representation of linear transformations. Change of basis, canonical forms, diagonal forms, triangular forms, Jordan forms. Inner product spaces, orthonormal basis. Quadratic forms, reduction and classification of quadratic forms

Complex Analysis: Algebra of complex numbers, the complex plane, polynomials, power series, transcendental functions such as exponential, trigonometric and hyperbolic functions.

Analytic functions, Cauchy-Riemann equations. Contour integral, Cauchy's theorem, Cauchy's integral formula, Liouville's theorem, Maximum modulus principle, Schwarz lemma, Open mapping theorem. Taylor series, Laurent series, calculus of residues. Conformal mappings, Mobius transformations.

Algebra: Permutations, combinations, pigeon-hole principle, inclusion-exclusion principle, derangements. Fundamental theorem of arithmetic, divisibility in Z, congruences, Chinese Remainder Theorem, Euler's Ø- function, primitive roots.

Groups, subgroups, normal subgroups, quotient groups, homomorphisms, cyclic groups, permutation groups, Cayley's theorem, class equations, Sylow theorems.

Rings, ideals, prime and maximal ideals, quotient rings, unique factorization domain, principal ideal domain, Euclidean domain. Polynomial rings and irreducibility criteria. Fields, finite fields, field extensions, Galois Theory.

Topology: basis, dense sets, subspace and product topology, separation axioms, connectedness and compactness.

Ordinary Differential Equations (ODEs): Existence and uniqueness of solutions of initial value problems for first order ordinary differential equations, singular solutions of first order ODEs, system of first order ODEs. General theory of homogenous and non-homogeneous linear ODEs, variation of parameters, Sturm-Liouville boundary value problem, Green's function.

Partial Differential Equations (PDEs): Lagrange and Charpit methods for solving first order PDEs, Cauchy problem for first order PDEs. Classification of second order PDEs, General solution of higher order PDEs with constant coefficients, Method of separation of variables for Laplace, Heat and Wave equations.

Numerical Analysis: Numerical solutions of algebraic equations, Method of iteration and Newton-Raphson method, Rate of convergence, Solution of systems of linear algebraic equations using Gauss elimination and Gauss-Seidel methods, Finite differences, Lagrange, Hermite and spline interpolation, Numerical differentiation and integration, Numerical solutions of ODEs using Picard, Euler, modified Euler and Runge-Kutta methods.

Calculus of Variations: Variation of a functional, Euler-Lagrange equation, Necessary and sufficient conditions for extrema. Variational methods for boundary value problems in ordinary and partial differential equations.

Linear Integral Equations: Linear integral equation of the first and second kind of Fredholm and Volterra type, Solutions with separable kernels. Characteristic numbers and eigenfunctions, resolvent kernel.

Classical Mechanics: Generalized coordinates, Lagrange's equations, Hamilton's canonical equations, Hamilton's principle and principle of least action, Two-dimensional motion of rigid bodies, Euler's dynamical equations for the motion of a rigid body about an axis, theory of small oscillations.