School of Engineering and Management

Ph.D. Entrance Test Schedule AY 2026-27

Details

Day: Saturday **Date**- 18th July 2026 **Mode-** Online

Exam Time- 10.00 am – 12.00 noon **Reporting time-** 9.30 am

Venue- School of Engineering and Management, D Y Patil Education Society Deemed to be University Kasaba Bawada, Kolhapur(Maharashtra)

Total Marks- 70 (35 marks – Research Methodology, 35 marks – Subject specific)

Interview – 1.00 pm onwards **Interview marks-** 30

For any queries Contact Dr. Grantej Vinod Otari (9922401619)

Ph.D. Entrance Test Guidelines

- An Entrance Test followed by Interview shall be a qualifying criterion for admission to Ph.D. programme.
- PhD Entrance Test will be of 70 marks (70 questions of one mark each with multiple choices) and Interview will be for 30 Marks.
- The Entrance Test shall consist of 50% questions based on Research Methodology and 50% shall be subject specific.
- **Day & Date: Saturday, 18/07/2026**
- **Reporting Time: 9.30am**
- **Exam Time: 10 a.m. to 12 p.m.** (The duration of the examination will be two hours).
- **Venue: School of Engineering and Management, D Y Patil Education Society (Deemed to be University) Kasaba Bawada, Kolhapur(Maharashtra)**
- The Examination Department shall process the result of the entrance test and prepare a list of candidates.
- The candidates will appear for interview at respective department
- The department shall organize interview and communicate the marks out of 30 for each candidate to examination department.
- The general merit list shall be prepared by using following formula for each candidate.

Total Score (100) = Entrance Test Score (70) + Interview Score (30)

- Final List will be displayed on 30th July 2026.

Dr. A. S. Patil
Director

PhD Syllabus for Common Entrance Test 2026-27

Section I (Common for all) (35 Marks, 35 MCQs)

Subject: Research Methodology

1) **Research Basics:** Definition, Characteristics, Objectives, Research, Scientific method, Types of Research: Descriptive vs. Analytical Research vs. Fundamental Research, Quantitative vs. Qualitative Research, Conceptual vs. Empirical Research
2) **Research Methodology:** An Introduction, Research Process, Overview, Defining the Research Problem, Formulating the Research Problem, Research Questions, Types of Research, Significance of Research, Research Methods Versus Methodology, Literature Review.
3) **Review Concepts and Theories:** Formulation of Hypothesis, Sources of Hypothesis, Characteristics of Hypothesis, Role of Hypothesis, Tests of Hypothesis
4) **Data Collection:** Observation Method, Interview Method, Questionnaires, Case Study Method, Processing and Analysis of Data, Interpretation of Data.
5) **Statistics of Research:** Descriptive Statistics Inferential Statistics, Elements/Types of Analysis
6) **Publications, Plagiarism, Intellectual Property Rights**: Quality of research work and papers –indexing, impact factor, H Index, citation index Meaning and principles of plagiarism, methods of plagiarism check, plagiarism checking software, Principles of intellectual property rights, patents, copyrights, trademarks and their importance.
7) **Research Writing:** Article, Essay, Research Paper, Research Project, Judgement Writing, Thesis, Dissertation, Book, Reviews- Book Review; Case Review
8) **Criteria of Good Research:** Research Ethics, Citation Methods, Plagiarism.

PhD Syllabus for Common Entrance Test 2026-27

Section II (35 Marks, 35 MCQs)

Subject: Computer Science & Engineering

1. **Engineering Mathematics:** Discrete Mathematics: Propositional and first order logic. Sets, relations, functions, partial orders and lattices. Monoids, Groups. Graphs: connectivity, matching, coloring. Combinatorics: counting, recurrence relations, generating functions.

   Linear Algebra: Matrices, determinants, system of linear equations, eigenvalues and eigenvectors, LU decomposition. Calculus: Limits, continuity and differentiability. Maxima and minima. Mean value theorem. Integration.

   Probability and Statistics: Random variables. Uniform, normal, exponential, Poisson and binomial distributions. Mean, median, mode and standard deviation. Conditional probability and Bayes theorem. Computer Science and Information Technology
2. **Digital Logic:** Boolean algebra. Combinational and sequential circuits. Minimization. Number representations and computer arithmetic (fixed and floating point).
3. **Computer Organization and Architecture:** Machine instructions and addressing modes. ALU, data-path and control unit. Instruction pipelining, pipeline hazards. Memory hierarchy: cache, main memory and secondary storage; I/O interface (interrupt and DMA mode).
4. **Programming and Data Structures:** Programming in C. Recursion. Arrays, stacks, queues, linked lists, trees, binary search trees, binary heaps, graphs. Algorithms Searching, sorting, hashing. Asymptotic worst-case time and space complexity. Algorithm design techniques: greedy, dynamic programming and divide-and-conquer. Graph traversals, minimum spanning trees, shortest paths Section 6: Theory of Computation Regular expressions and finite automata. Context-free grammars and push-down automata. Regular and context-free languages, pumping lemma. Turing machines and undecidability.

5. **Compiler Design**: Lexical analysis, parsing, syntax-directed translation. Runtime environments. Intermediate code generation. Local optimization, Data flow analyses: constant propagation, liveness analysis, common sub expression elimination.
6. **Operating System:** System calls, processes, threads, inter-process communication, concurrency and synchronization. Deadlock. CPU and I/O scheduling. Memory management and virtual memory. File systems.
7. **Databases:** ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. File organization, indexing (e.g., B and B+ trees). Transactions and concurrency control. Section
8. **Computer Networks:** Concept of layering: OSI and TCP/IP Protocol Stacks; Basics of packet, circuit and virtual circuit-switching; Data link layer: framing, error detection, Medium Access Control, Ethernet bridging; Routing protocols: shortest path, flooding, distance vector and link state routing; Fragmentation and IP addressing, IPv4, CIDR notation, Basics of IP support protocols (ARP, DHCP, ICMP), Network Address Translation (NAT); Transport layer: flow control and congestion control, UDP, TCP, sockets; Application layer protocols: DNS, SMTP, HTTP, FTP, Email.

PhD Syllabus for Common Entrance Test 2026-27

Section II (35 Marks, 35 MCQs)

Subject: Computer Application

1. **Probability & Statistics:** Random variables. Uniform, normal, exponential, Poisson and binomial distribution, Conditional probability and Bayes theorem., Mean, median, mode Measures of Dispersion, Correlation, Regression, Time series analysis**.**
2. **Operating System:** Operating System: Processes, threads, inter-process communication, concurrency and synchronization, Deadlock; CPU scheduling; Memory management and virtual memory; File systems
3. **Databases Management System:** ER-model. Relational model: relational algebra, tuple calculus, SQL. Integrity constraints, normal forms. File organization, indexing (e.g., B and B+ trees). Transactions and concurrency control
4. **Computer Networks:** Network models: OSI Reference model & TCP/IP Reference model, data transmission media, multiplexing & switching techniques, routing algorithms, congestion control algorithms, transport and application support protocols.
5. **Data Warehouse & Data Mining :** Introduction to Data warehousing, Architecture, Dimensional data modeling - star, snowflake schemes, fact constellation, OLTP & OLAP system, data mart, data cubes, Operations on cubes, Data preprocessing - need for preprocessing, data cleaning, data integration and transformation methods, data reduction Data Mining, Association and Correlations – Mining various kinds of Association rules – Market Basket Analysis, Apriori Algorithm, Correlation Analysis , Outlier analysis, Clustering - , - k means algorithm, Classification – decision tree, association, rules
6. **Software Engineering:** Software Development Life cycle models, requirement engineering, system design, software testing & maintenance, software metrics & measurements

7. **Data Structures:** Stack, queues, linked list, trees, binary search trees, searching & sorting techniques.

8. Programming Languages:

i) **Programming in C:** Elementary Data Types; Tokens, Identifiers, Data Types, Sequence Control, Subprogram Control, Arrays, Structures, Union, String, Pointers, Functions, File Handling, Command Line Arguments, Preprocessors

ii) **Programming in C++:** Class, Object, Instantiation, Inheritance, Encapsulation, Abstract Class, Polymorphism, Tokens, Identifiers, Variables and Constants; Data types, Operators, Control statements, Functions Parameter Passing, Virtual Functions;

iii) **Programming in Java:** The Java Virtual Machine, Data types, Conditional and looping Statements, Arrays, Methods and functions, Constructors, Overloading methods, Garbage collection, Packages

9. **Recent Trends in IT:** Recent Practice used in Software Project Management, AI Applications, Knowledge based systems, Business Intelligence, Image Processing, Pattern Recognition, Mobile Computing

PhD Syllabus for Common Entrance Test 2026-27

Section II (35 Marks, 35 MCQs)

Subject: Management

1. **Management** - Definition and scope, Management functions and process, Management Roles and Skills, Managing -systems and contingency perspective, Managing Internal (Organizational Culture) and External Environment, Social responsibility and Managerial Ethics, Managerial Decision making- Process, Types of problems and decisions, Decision making conditions & styles, Functions of Management.
2. **Marketing-** Core Concepts in Marketing-Value, Satisfaction, Marketing Mix. Marketing Environment, Understanding Consumer and Industrial Markets; Market Segmentation-Targeting and Positioning; Product Decisions, Product mix. Product Life Cycle; New Product Development; Branding and Packaging; Pricing Methods and Strategies. Promotion Decisions, Promotion mix; Advertising; Personal Selling; Channel Management; Vertical Marketing Systems Marketing of Services; Customer Relation Management, Digital Marketing, e-commerce-B2B, B2C.
3. **Human Resource Management and Organizational Behavior -** Concepts and Perspectives in HRM- Human Resource Planning- Objectives, Process and Techniques. Job Analysis-Job Description- Job Evaluation. Recruitment and Selection. Training and Development- Types, Training Need Analysis and methods. Performance Appraisal and Evaluation Types and Methods. Compensation Management and Wage Determination. Industrial Relations and Trade Unions. Concept and significance of organizational behavior, Theories of organizational behavior, Organizational Structure, Individual behavior - Personality-Perception-Values-Attitudes; Group Behavior-Group dynamics, Teamwork. Motivation- Types and Theories of Motivation. Leadership – Types and Theories. Learning – Types and Barriers. Conflict Management – Types. Change Management, Communication - Types and Barriers.

4. **Financial Management & Economics:** Financial Management-Nature and Scope. Long Term and Short Term financing instruments. Time value of Money and Cost of Capital. Capital Structure. Capital Budgeting and Risk analysis. Working Capital Management. Dividend policy, determinants. Financial analysis, Ratio analysis and Cash flow statements. Managerial Demand Analysis, Production Function and Production Theory, Cost-Output Relations, Market Structures, Pricing Techniques, Demand – Cost – Profit – Forecasting, Macro Economics, National Income Concepts, Economic policy – Export import Policy, Business Environment
5. **Business Ethics, Entrepreneurship, Innovation & Management Strategy:** Concept of Corporate Strategy; Components of Strategy Formulation; Ansoffs Growth Vector; BCG Model; Porter's Generic Strategies; Competitor Analysis; Strategic Dimensions and Group Mapping; Industry Analysis; Competitive strategy and Corporate Strategy; Managing Cultural Diversity; Global Entry Strategies; Globalization of Financial System and Services. Ethical issues in Management; Corporate Social Responsibility; Corporate governance and ethics. Innovation and Entrepreneurship; Small Business-Concepts Government policy for promotion of small and tiny enterprises; Process of Business Opportunity Identification Detailed business plan preparation; Managing small enterprises; Planning for growth; Sickness in Small Enterprises; Rehabilitation of Sick Enterprises; Entrepreneurship (Organizational Entrepreneurship) Start-up Ventures.