



TEERTHANKER MAHAVEER UNIVERSITY

(Established under Govt. of U. P. Act No. 30, 2008)

Delhi Road, Moradabad (U.P.)

PhD PROGRAMME

SYLLABUS FOR DISCIPLINE-SPECIFIC COURSE MECHANICAL ENGINEERING

Course Code: PDS240132	Advances in Mechanical Engineering	L	T	P	C
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Objective:	To familiarize the research scholar with the fundamentals of scientific research.				
Course Outcomes:	On completion of the course, students will be able to:				
CO 1:	Understand the basic and advanced manufacturing process				
CO 2:	Understand the different Mechatronics System Architecture				
CO 3:	Analyze the rules for addition of probabilities				
CO 4:	Analyze the quality function parameters				
CO 5:	Evaluate the concept of reengineering				
Course Content:					
Unit 1:	Classification of Manufacturing Process: Importance and perspective of machining process, Schematic Representation of machining system, Different types of motions to generate different shapes. Computer Integrated Manufacturing: Batch Production and Mass Customization, Concept of Integrated automation, Concurrent Engineering. CAD & CAE: Feature based Design, parametric design, Fundamentals of FEA, Role of CAD in CIM environment.				
Unit 2:	Introduction to Mechatronics: Definition, Mechatronics System Architecture, Comparison between Conventional and Mechatronics approach. Building Blocks of Automation: Sensors, Analyzers, Actuators, Drives. Digital Electronics: Fundamentals of digital electronics, logic gates and their operations, Data conversion devices, Truth Tables, Boolean Algebra, Karnaugh Maps, Sequential and Combinational Logic Circuits, Encoder, Decoder, Data Multiplexing & Demultiplexing.				
Unit 3:	Introduction: History Of Statistical Process Control, Quality And Quality Management Techniques, Basic Principles Of Statistical Quality Control. Basic principles of Statistics: Basic Statistics and Types of Distributions (Normal, Exponential, Binomial, And Poisson's Distributions). Control chart for variables: Different types of control charts, Preparation of control charts for variables (X, R charts and σ chart)				
Unit 4:	Quality function parameters: Product planning, product design, process planning process control, Customer requirements, Design requirements, Process operation, operation requirements. QFD Process: Customer requirements, Fuzzy Logic, Planning Matrix, Technical features, Deployment Matrix, Process Plan and Quality control charts, Operating instructions.				

Unit 5:	Reengineering: Definition, Reasons for Reengineering, Development of Business Process reengineering, Three 'R's of Reengineering, Requirements of reengineering process, Reengineering in the service industries, Quality and reengineering, Reengineering and TQM. Human Process Reengineering, Organizational Reengineering, Reengineering Tools, Changes that occur in Reengineering
Textbooks:	<ol style="list-style-type: none"> 1. Fundamentals of machining and machine tools by Boothroyd, G. and Knight, W. A. (2006), 3rd Edition, CRC Press, Taylor and Francis Group 2. Introduction to Mechatronics and Measurement Systems by David G. Alciatore, Michael B. Hstand, Mc Graw Hill 3. Introduction to Statistical Quality Control by Douglas C. Montgomery, Wiely Pub, U.K. 4. Quality planning and analysis by J.M. Juran, F.M. Gryna, Tata McGraw –Hill. 5. Total quality management by K. Shridhara Bhat, Himalaya Publishing House. <p>*Latest editions of all the suggested books are recommended.</p>
Reference Books:	<ol style="list-style-type: none"> 1. Numerical Control and Computer Aided manufacturing by R. S. Pressman & J. E. Williams, John Wiley & Sons. 2. Mechatronics by Bolton, Pearson Education. 3. Quality Planning and Analysis by Juran, Tata Mc Graw Hill. 4. Total quality management by K. Shridhara Bhat, Himalaya Publishing House. 5. Total quality management by K. C. Arora, S. K. Kataria & Sons.
Additional Electronic Reference Material:	<ol style="list-style-type: none"> 1. https://archive.nptel.ac.in/courses/112/107/112107078/ 2. https://archive.nptel.ac.in/courses/111/105/111105077/